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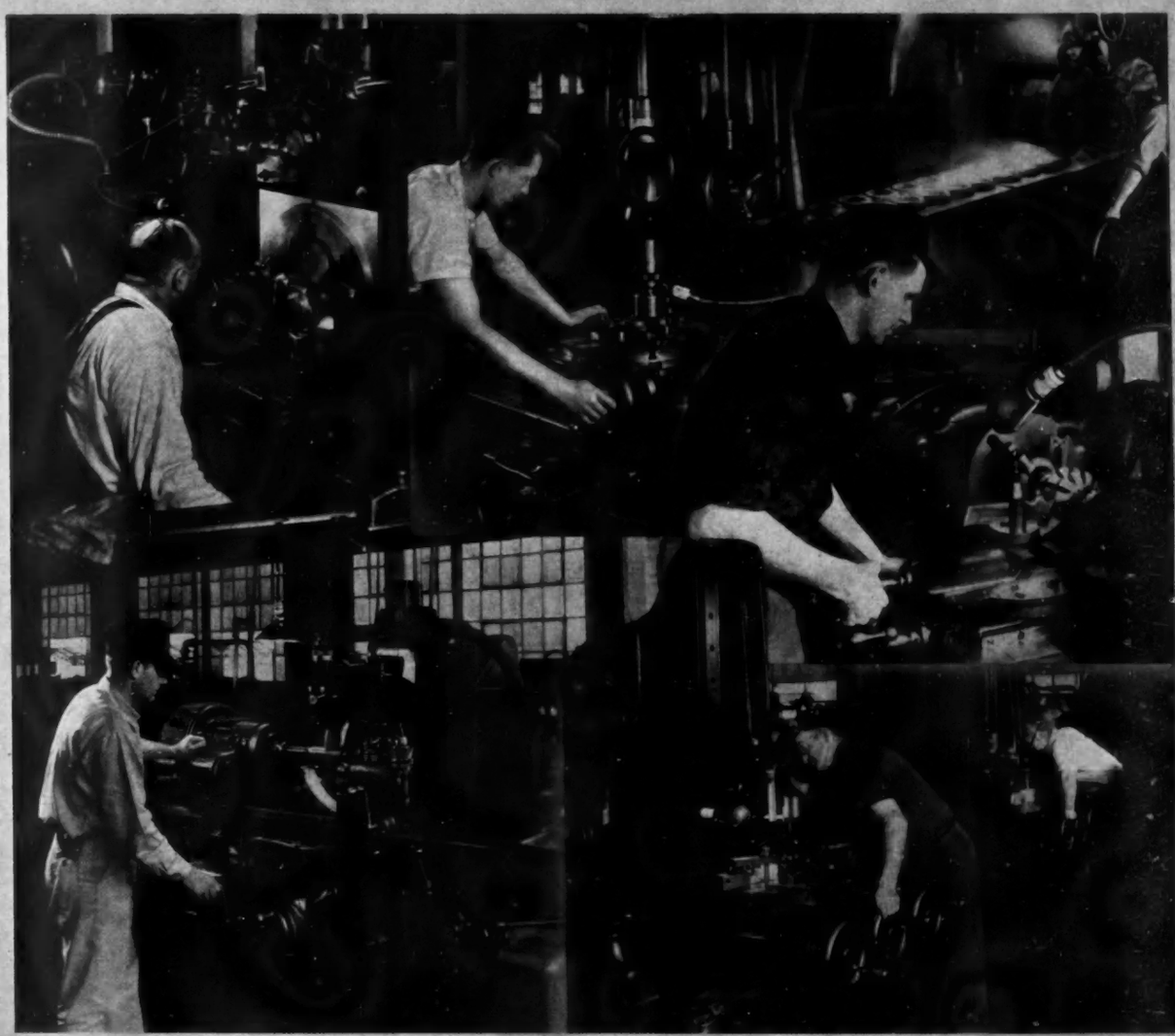

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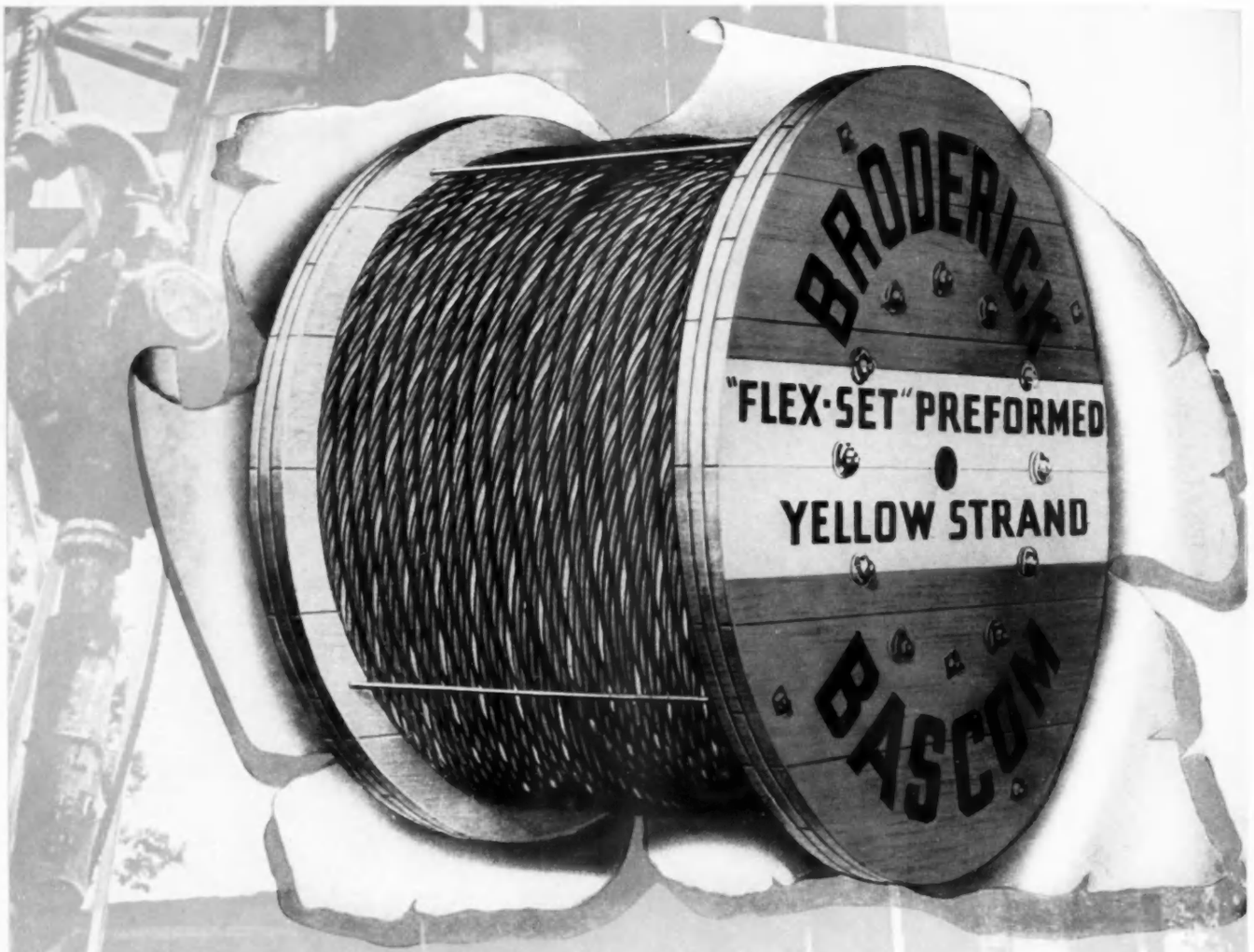

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LOOKING AHEAD
. . . with the Editor

A FOUR part symposium on secondary recovery methods, which are due to play a more important role in future United States' oilfield operations because they promise to assist in the supplying of the greatly increased petroleum volumes that will be needed, will be started in the next issue.

This symposium consists of the following chapters:

Part 1—"Significance of Secondary Recovery in the United States," by Paul D. Torrey, chairman of the Standing Subcommittee on Secondary-Recovery Methods, American Petroleum Institute.

Part 2—"Engineering Phases of Secondary Recovery," by George H. Fancher, Professor of Petroleum Engineering, University of Texas.

Part 3—"Factors Necessary for Consideration in Planning a Secondary-Recovery Development," by R. C. Earlougher, Geologic Standards Company.

Part 4—"Flowing Water-Flood Production," by T. F. Lawry, Forest Producing Company.

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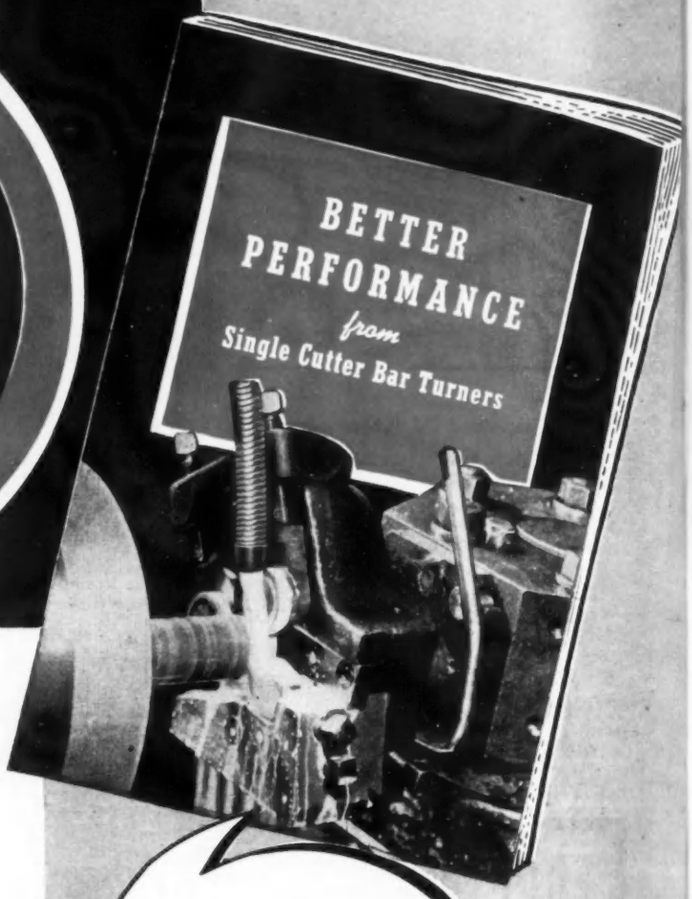

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The Changing Panorama

Oil Production on Way to Record Level

UNITED STATES production of crude oil is well on its way toward an all-time peak, having amounted to 585,000,000 barrels during the first five months of 1943. A new annual record will be established if the industry produces an average of 3,900,000 barrels daily for the remaining seven months, which is considerably under the current rate, as output in May averaged 3,995,000 barrels per day. With military consumption rising rapidly, and additional shipping facilities soon to make it possible to deliver a larger quantity, production for the remainder of the year might conceivably average close to 4,100,000 barrels per day. Thus 1943 crude production may approach 1,450,000,000 barrels, in contrast with the present all-time peak of 1,404,000,000 barrels established in 1941.

And as yet, despite record production, the supply of oil has not been balanced with consumption, for a total of 5 million barrels have been taken from storage during the first 5 months of the year. The reduction in stocks is the result of heavy withdrawals of refined products, 15 million barrels of these having been taken from tanks during the period, while 10 million barrels of crude oil have gone to storage. Consequently, crude runs to stills may have to be increased sufficiently during the remainder of the year to push this operation to a new annual peak also. For a new record volume of crude to be charged to stills 122,000,000 barrels of oil must be refined monthly, and the past month saw 112,500,000 barrels of crude go to stills. Stocks of refined products are getting so low it may be necessary to boost runs to stills sufficiently to attain this rate. Certainly they will be near an all-time peak level.

More Fuel Oil Now Used Than Gasoline

FUEL oils are now being consumed in considerably larger quantities than any other petroleum product. For years the consumption of fuel oils has been increasing at rates greater than that of gasoline, and in recent years they have vied for first place in volume with gasoline. Under the impact of war, the combined consumption of distillate and residual fuels in 1942 rose to an all-time peak of 641 million barrels, despite conversion of oil-burning furnaces to coal in the Eastern area. This was 25 million barrels more than the consumption of gasoline.

Now, under the impetus of nation-wide gasoline rationing and continued growth in fuel-oil needs as naval and industrial operations increase, the quantity of fuel oils being used further exceeds that of gasoline. Production of both fuel oils, distillate and residual, has totaled about 245 million barrels during the first 5 months of 1943, during which time 15 million barrels have been taken from storage to satisfy demand. Gasoline production in the same period has amounted to about 220 million barrels and 1½ millions have been added to storage. Thus demand for fuel oils is indicated to be roughly 260 million barrels for the first 5 months of the year, and consumption of gasoline 218½ million barrels. Consumption of fuel oils during the period was 41½ million barrels greater than that of gasoline, whereas there was a difference between the two of only 25 million barrels for the whole year of 1942.

Fuel Oil Critical War Product

IN VIEW of low stocks and rising consumption, the time is approaching when it will be necessary for PAW to include residual fuel oil in the list of critical war products. Why this has not been done previously is a mystery hard to explain. It is used in exceptionally large quantities to power railroad locomotives, and both navy and merchant boats, and by industrial plants making war implements. Certainly, every one of these operations is as vital to the war as any other activity that can be named.

The difficulty of producing sufficient quantities of fuel oil to meet essential consumption requirements has been so critical that refiners have had to adjust yields to obtain larger volumes of this product. This action has been recognized as a necessity by PAW—yet fuel oil has not been included in the list of petroleum war products.

Oil Is Ammunition

Three hundred four-motor bombers leaving a British base to bomb Berlin need more than 525,000 gallons of aviation gasoline before they get back, or slightly more than a day's ration for all of Baltimore. Thus each bomber that bombs Berlin burns about 1750 gallons during the few hours it is in the air, which is equivalent to a 8½-year supply for a United States motorist holding a 4-gallon per week "A" ration card for his automobile.

Gulf Refined Stocks Dangerously Low

EXCEPTIONALLY heavy demand for oil in recent weeks has reduced refined product stocks in Texas, and particularly in the Gulf Coast area, to decidedly unsafe levels. There is need for immediate improvement in the situation, for should the immediate future see another exceptionally large call like that of early May there might not be enough of certain products. Furthermore, forthcoming events foreshadow the need for larger refined stocks in the region; the big-inch pipe line probably will move some fuel oil during July, and also a working supply for the 20-inch product line should be built up before September.

The Gulf Coast territory, because of its large refining capacity and ability to produce larger quantities of oil, has always been looked upon as the nation's margin of safety for sudden spurts in petroleum demand. This situation should be maintained for security reasons as long as possible.

The stock situation has almost reversed itself in the last 90 days. Texas Railroad Commission reports show that a daily average of 59,428 barrels were taken from the state's refined storage during March, and that this increased to an average of 108,659 barrels daily during April. The rate of withdrawal during early May was even higher. Tanks at Gulf Coast refineries now are less than 50 percent full of refined products, whereas they formerly were 70 percent full. Normal refining practice is to maintain at least 65 percent of the storage filled. Even gasoline stocks have been sharply reduced. Eighty-octane all-purpose gasoline is scarce, and only a surplus of third-grade gasoline seems to exist.

These developments indicate that increased crude runs to refinery stills are highly desirable to improve the stock

situation. Fortunately, new Gulf Coast plants will be coming into operations soon, and their output may help the situation. The action of PAW in raising Gulf Coast refinery runs 45,000 barrels per day also is a good move. However, it appears that the latter advance is not sufficient to relieve the stock situation, and that more of the capacity of existing plants should be utilized. Refineries in the Coastal area have a capacity for handling about 1,300,000 barrels daily, and the new raise boosts runs to slightly less than 1,150,000 barrels when natural gasoline is included. Some of the so-called war plants are running to capacity and a few others might find it advantageous not to boost runs so as to maintain efficient operations that will produce the most war products, but there are others that could refine larger quantities.

Synthetic Rubber Here to Stay

CONFIDENCE that synthetic rubber henceforth will eclipse natural rubber in importance has been voiced recently by Rubber Director William M. Jeffers and Dr. Willard H. Dow, head of Dow Chemical Company.

"Synthetic rubber after the war," says Jeffers, "will be cheaper than natural rubber, and as durable, if not more so, for most purposes."

"After the war, there will be as many different kinds of synthetic rubber as there are manufacturing companies," Dow predicts. "Each product will have its own particular qualifications and will be supplied to tailor-made specifications . . . Synthesized rubber will become better than the natural. Uniformity of specifications and lower costs will permanently establish it as a new industry."

Touching on competition between synthetic and natural rubber, Dr. Dow has declared that "there was no fundamental competition between the substances—that the competition was between the skilled labor of the factory and the coolie labor of the plantation. "May it not be a law of nature," he asks, "that the product which may be turned out by the well paid, well fed, well housed worker must displace the product which requires men to work in the manner and at the wages of a beast of burden?"

Spacing Relaxation May Help Production

WHAT effect the recent modification of PAW regulations governing spacing will have on production and drilling rates in Oklahoma, Eastern Kansas, North Texas and Southwestern Michigan, is one of the questions uppermost in the minds of oil operators.

Whether these areas will receive proportional benefits in production increases as did Illinois, Indiana and Kentucky, of course, will not be known until the modification order has been in effect a number of months. However, results in Illinois, Indiana and Kentucky provide material for study and thought.

From the time the modification order went into effect in the Illinois Basin, September 1, 1942, until May 25 this year, a total of 657 tests were started which would not have been drilled had not spacing regulations been relaxed. Illinois had 499 of the three-state total.

New production resulting from wells which would not have been drilled on a 40-acre spacing program, materially added to production. The 657 tests drilled resulted in 468 oil producing wells with an approixmate initial production of 65,000 barrels. Illinois accounted for 377 of the additional oil wells with an approximate initial production of 47,000 barrels.

If Illinois' production from the wells drilled as a result of the modification in spacing, now are producing but half of their initial production, it still would mean that spacing relaxation is responsible for keeping Illinois production above the 200,000-barrel-per-day mark.

Bombs and Pipe For Oil Wells

SWING of bomb production from the (relatively) little 100, 200 and even 500-pound bombs to the "block buster" type, as evidenced by the cancelling of some contracts for the smaller units and the tapering off of others, holds some ray of hope that the oil industry may get an increased quantity of tubular goods.

Raw material for the shell or outer envelope of many of these bombs has been seamless tubing in sizes and weights which, no longer required for explosives containers, may again be turned out in oil-country tubular goods and thus aid in some measure in alleviating the shortages now hampering development work.

The amount of tubing used to make one bomb is relatively small, but when production has been in millions, cancellation of an order for even 1,000,000 bombs will release something like 3 million feet of tubing of that particular size, which is enough for 964 average (3112-foot) wells. Revision of bombing pattern, then, will help to furnish more oil for carrying more of the big "block busters" and thus speed the end for the Axis.

—International News Photo

Quick construction of this emergency by-pass link, is keeping oil flowing eastward through the big-inch pipe line until repair crews have an opportunity to repair the main artery which was ruptured by Arkansas River floods. To speed building of the emergency line, it was laid across a nearby railroad bridge as shown here.

War Forces Use of Petroleum Substitutes Throughout World

By L. J. LOGAN, Associate Editor

Many countries resort to substitutes for petroleum. Satisfactory liquid motor fuels are made from oil-shale and coal, particularly in Germany, which has fairly well met military and essential civilian requirements. Having little or no petroleum and no facilities for making liquid fuels from coal or other sources, many other countries fall back on producer gas installations, built in motor vehicles or carried on trailers, to produce combustible gas in transit, from coal, charcoal, wood, or other vegetable materials.

ALTHOUGH the United States is having difficulties in meeting demand for petroleum, its troubles so far have been small compared with those encountered in most other countries. Viewing the conditions abroad emphasizes the importance of petroleum supplies for any nation and suggests that much farsighted planning toward assuring adequate oil needs in the future is vitally essential. Conditions abroad also emphasize the preeminence of petroleum as a convenient and efficient source of power for transportation. They show also that natural petroleum is not indispensable; that substitutes can be made to serve the purpose of petroleum with satisfactory results if necessary, and that any great nation cannot afford to rule out the desirability of having available capacity for making the better substitutes. These developments presage possibilities of important progress in non-petroleum fuels.

In reflection of the fact that the Axis powers were and are deficient in natural petroleum, indicated production of petroleum substitutes increased in 1942 to a new high of 7½ percent of world production of all oils—petroleum and substitutes, according to data of V. R. Garfias, R. V. Whetsel and J. W. Ristori, of Cities Service Company, in a paper presented before the American Institute of Mining and Metallurgical Engineers. Germany has steadily increased synthetic oil production and in 1942 the output was estimated at about 46,000,000 barrels or nearly one half of the current total supply of petroleum and substitutes for the European Axis, including Rumanian crude production.

Indicated production of petroleum and substitutes in the world in 1942 was about 2,208,000,000 barrels, or 171,000,000 less than in 1941. Oil production decreased about 200,000,000 barrels (9 percent), while estimated production of substitutes increased 28,500,000 barrels (nearly 20 percent). In the United States oil output was down 19,000,000 barrels (less than 2 percent), while production of oil in foreign countries declined about 180,000,000 barrels (over 20 percent). The sharp decline abroad reflected decreases in Venezuela and Colombia, due to shortage of tankers, and in the East Indies and Burma, due to military invasion and destruction of properties, while invasion of Russia caused the sharp drop there.

Total production of petroleum and substitutes for the European Axis powers was estimated by Garfias and associates at about 112,000,000 barrels for 1942—up 20 percent over 1941, in reflection of stepping up of output of substitutes from 40,700,000 barrels in 1941 to 55,800,000 in 1942 in those nations and the countries they control. The success with which Germany has gotten by up to now with regard to oil, emphasizes the importance that petroleum substitutes can assume in a case of necessity.

There are many countries, including the United States, which have shale and coal, the best sources for petroleum substitutes, in large quantities. But only Germany so far has made important use of these sources. Having previously relied on petroleum, other countries during the war have resorted to the emergency use of coal and lignite and also to charcoal and vegetable materials in producer-gas equipment for running motor vehicles. However, these devices are generally clumsy and inconvenient, and for the military and more essential uses, substitute liquid fuels are used where petroleum is not available.

The measures that have become necessary throughout the world in attempting to replace petroleum are numerous and varied.

Asia and Oceania

In Australia there are now about 36,000 producer-gas vehicles in use, including a few low-power rail cars. The machines burn charcoal, and the price of charcoal is fixed.

As a means of side-stepping motor-fuel shortage in China, trucks are being converted to charcoal burners. Five hundred charcoal burners and 200 gas cylinders to convert trucks from gasoline were bought by China Transport Corporation, which handles all non-military passenger and freight traffic in Southwest China. Although plentiful, charcoal is estimated to be only about 58 percent as efficient as gasoline. Eight charcoal-burning trucks are in constant operation transporting medical supplies to hospitals throughout Free China, by Quakers in their Friends' Ambulance Unit.

Three hours are required to start the morning charcoal fire in a hopper. Once started, the 250-pound charcoal fire in each truck's hopper produces enough gas to take a truck 120 miles if the road is level, and 67 miles if the roads are uphill. All charcoal-burning vehicles must still be started on gasoline.

The China Convoy maintained by the Quakers, is operating a fleet of 38 trucks in addition to two mobile medical units. The loss of gasoline supplies in Burma has created many problems. Eight Friends' trucks are equipped with diesel engines which consume native crude oil, and fuel is manufactured from vegetable oils. The convoy has been experimenting with various other fuel such as tung oil, paraffin and alcohol, besides the charcoal, in an effort to keep its trucks on the road.

Shortage of motor fuel in India has caused the conversion of more than 6000 motor vehicles to use producer gas, and it is expected an additional 12,000 will be changed over. The Communications Department of the Government of India is assisting the producers of power-alcohol and rectified-spirit plants. Charcoal depots are supplementing fuel pumps and the manufacture of charcoal is being encouraged. There is the

problem of whether it will be possible to continue the supply of government-graded charcoal for producer-gas plants in adequate quantities if the government price is less than the market price of domestic charcoal, as the graded charcoal would then be in demand for domestic use.

Africa

Receipts of some petroleum products in the Spanish Zone of Morocco were resumed in the final quarter of 1942, and the previous extreme shortage has been somewhat relieved. Trucks and busses resumed practically normal operation and some automobiles began to circulate again, while the fishing industry resumed activity after having been virtually at a standstill. Mining operations also now are better able to proceed, with urgently needed lubricants made available.

Europe

In Denmark, wide scale conversion of road vehicles, tractors, and ships to producer gas, where possible, is under way. Over 14,000 vehicles are reported equipped with producer gas plants. Numerous sawmills specialize in supplying wood for generators. However, shortages of wood and charcoal are developing, and substitution of peat and peat-wood mixtures is urged, although peat is difficult to filter as a generator fuel, while it also is about twice as expensive as wood in operating vehicles. About 12 tons annually of peat coke is required to operate a passenger car.

The Nazis are endeavoring to produce 182,000 metric tons of shale oil in Estonia in 1943, according to press reports, from the German-rebuilt Sillamagi plants near Narva, destroyed by the U.S.S.R. forces before they retreated. This would equal pre-war output.

Alcohol Trading Company, a Finnish organization, is planning to establish a plant along the water system of Lake Paijanne for large-scale production of wood-sugar, from which motor fuel will be derived—if the government authorizes the project.

Vichy authorities are encouraging the use of producer gas on canal and river boats to help ease the strain which the shortage of motor fuel is causing in France. It is hoped that this change will help to relieve the overburdened railways. Air services have been suspended except for a daily air mail service from Toulouse to Marseille.

A new company, "Standard-Kuhlmann," has been established in Paris, which in addition to producing chemical products, will engage in production and sale of automotive fuels, lubricants, and substitute fuels.

A Paris chemical concern has obtained a concession for lignite mining near St. Hilaire, according to European press reports, and will erect a factory for production of liquid fuel from the lignite. The company is Societe de la Grande Paroisse.

A new type of road vehicle, with pedals as well as a sail, has appeared in Paris. It carries 3 passengers, and can reach a speed of 30 miles an hour under favorable conditions.

German factories are producing a new fuel, generator-briquets, from lignite, say British trade reports. This is an important step in the conversion of German motor transport to the generator-gas vehicle. For the time being this fuel is being used in conjunction with wood, because of the small number of vehicles equipped to use the briquets alone.

Germany has placed heavy restrictions on producer-gas-run trucks, preventing their use in or near where gasoline or other inflammable liquid is stored or where there is the possibility of explosive gases or dust, and also limits the transport by these trucks of certain materials and liquids. Heavy motor busses are being replaced by light metal trolley-busses.

Italian civilian motor traffic has greatly decreased during the past year, causing financial loss for several companies operating the motor roads. Interest has been revived in the 40-year-old project for the creation of a navigable waterway between Lake Maggiore and the Adriatic, with Locarno, Switzerland, and Venice, Italy, as the terminals. The recently created General Commissariat for the Fuel Industry and the incorporation of the 21 seized Anglo-American petroleum companies into the government AGIP (Azienda Generale Italiana Petroli), will extend raw-material sources, says the German press.

In Albania, production of crude oil is to be extended beyond the Devoli district to other parts of the country, and in Greece, production is to be begun in Epirus and other sections. In Croatia, Hungary, and Rumania, AGIP has taken new steps for mineral-oil production and trade. AGIP has an interest in SICS, a recently organized company for synthetic fuels, and is also taking unusual interest in the development of gaseous fuels (methane), which exist in relatively abundant quantities in Italian soil. One new methane plant is under construction near Turin, Italy, and production is expected to begin during the summer, with daily output to be 3500 cubic meters daily. To exploit asphalt deposits in the Abruzzi, AGIP and IRI founded a new company, ALBA.

All regular passenger and freight transport enterprises in Portugal must now operate at least 25 percent of their vehicles on town gas, producer gas, methane, or other forms available locally, according to a recent decree by the Portuguese government.

The Soviet Union has been successfully experimenting in the use of crude turpentine and rosin as liquid fuel for tractors.

During the last half of 1942 Sweden delivered 450 charcoal gas-producer units to Portugal, while negotiations were also going forward to deliver gasogenes to Argentina, Turkey, Spain, and other countries where the allotment of gasoline to the consumers has been drastically reduced. Sweden has been a pioneer in the manufacture of charcoal or wood-gas units, since the acute shortage of liquid fuels started. Sweden has under construction in different parts of the country 20 retort charcoal furnaces, to alleviate the urgent need of wood tar for motor fuel.

Using the Ljungstrom system of electrically heating the shale beds, the Swedish State Shale Oil Company has produced about 75 cubic meters of oil directly from shale beds. Use of this method of production on a larger scale is expected to yield about 5000 metric tons of oil a year. If this Ljungstrom method is adapted to large-scale production, it would require a good supply of electricity, while Sweden's present water-generated power is hardly sufficient for ordinary consumption.

A shale-oil plant at Kinne-Kleva (Kinnekulle) in the Province of Vastergotland, owned and controlled by the Swedish Naval Authorities, now produces about 30,000 metric tons of fuel oil a year, chiefly for the Swedish navy. A new test plant at this location has started the production of light benzine, utilizing a gas of high quality which, together with shale oil, is obtained from the shale-distillation process. There is also experimenting in the manufacture of gas oil.

Although latest statistics showed that Swedish automobile traffic for 1942 was well above that for 1941, although many passenger cars were withdrawn from use and their tires removed. Commercial traffic, reaching a critical stage, is likely to necessitate strict rubber-economy measures.

So far about 13,000 motor vehicles (or 10 percent of the cars, trucks, and tractors registered) in Switzerland were converted to use of substitute fuels for operation. These reconstructed vehicles used acetylene, wood, wood coal, and electricity.

United Kingdom

Conversion of motor vehicles to the use of producer gas will proceed in England under plans calling for output of 1000 gas-producing plants per month. And it is contemplated that by June of

1943 producer-gas equipment will be in operation on 7000 trucks in ordinary commercial service and on 3000 public-service and government-owned vehicles, including about 2500 busses. Both built-in and trailer-type generators will be employed. Operators of fleets of over 10 vehicles have been asked to convert, if possible, at least 10 percent of their fleet. The producers will be sold at about $400 each. They will operate on anthracite coal mined in South Wales.

The 2500 busses that will be equipped with producer-gas equipment will absorb the like number of trailer-type producer-gas units which are being built. In addition, about 500 trailer units of heavy design are being made for heavy trucks and as spare equipment.

Gasoline-engine conversions are primarily desired, although operators are advised to obtain experience with diesel-engine conversions, if wholesale conversions become necessary.

Coal gas to propel vehicles is now licensed in Great Britain, for use in vehicles engaged on essential work. The diesel-driven busses operating in the Halifax district of England are running on a mixture comprising 30 percent creosote and 70 percent fuel oil, and it is planned to put more vehicles on this mixture.

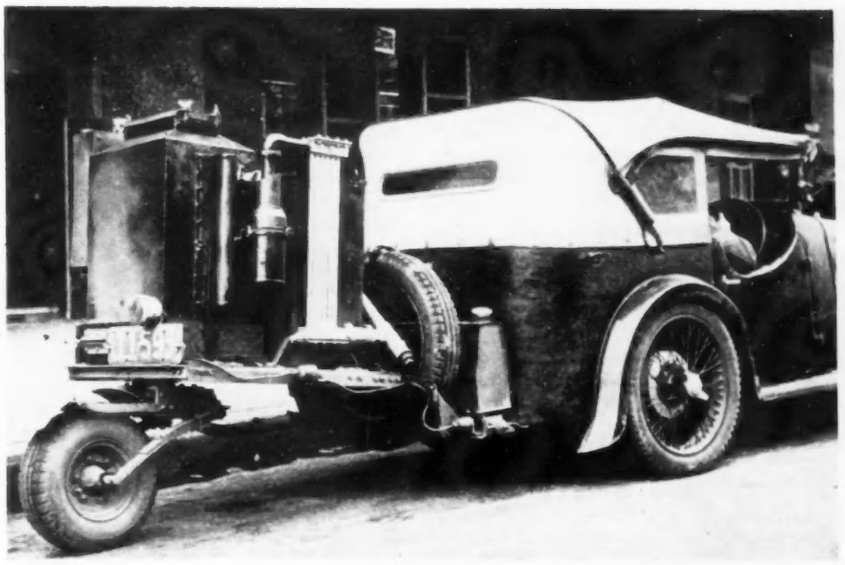
An innovation in producer-gas equipment in England is a type burning sawdust, mounted on a trailer and somewhat larger than other types. It offers the advantage of comparatively quick starting, the vehicle being able to take off in a few seconds on the gas generated from the burning sawdust.

Ireland's fuel oil shortage is more acute in 1943 than in 1942, with receipts of gasoline, kerosine, and other fuel supplies further reduced. Non-essential motor transport has virtually been stopped throughout the country, and there has been further curtailment of bus service in Dublin. The limited supplies of gasoline must go first toward filling requirements of trucks for hauling essential goods before allocations to other owners of vehicles. Kerosine supplies are barely sufficient for agriculture and industry.

The shortages of gasoline, replacement parts, and tires have caused sharp curtailment of motor vehicle assembling in Eire, and servicing of commercial vehicles and agricultural tractors is becoming increasingly difficult, while the tire situation is acute. Vehicles assembled declined from 5806 in 1940 to 1295 in 1941, and there has been further decline subsequently.

Bus services have been curtailed in Scotland. Only workers with priority tickets or passes are allowed to board late busses.

Many service stations have been closed down in Canada, in reflection of



Many are the contraptions and inventions used to meet the motor fuel problem. An Australian passenger car (top) uses a charcoal-gas-producing plant almost as big as the car. Trucks in London (center) pull a contraption that generates producer gas, and in Paris (bottom), motorcycles burn charcoal.

—Press Association and Wide World pictures

the scarcity of motor fuel and increasingly strict rationing of that product.

The Dominion government has appropriated $500,000 for improving a plant that extracts oil from the Alberta tar sands. The government hopes to recover costs in making paving material for the Alaska highway.

Some passenger automobiles have tried out the use of natural gas from Canadian fields for propulsion of the vehicles, with special carburetors feeding the gas into the motors from low pressure bags mounted on top of cars.

Canadians meanwhile are energetically searching for new oil fields to provide increased supply.

West Indies

Rationing of gasoline in Panama and the Canal Zone, patterned after that in the United States, has been in effect since last fall.

There is a shortage of charcoal and wood for fuel in the Barbados, British West Indies. Gasoline and kerosine for cooking are rationed and kerosine for lighting may be rationed.

Cuba is studying the use of alcohol as a substitute for gasoline, and expects to save about $4,000,000 a year by mixing 25 percent alcohol with the gasoline it now imports. Cuba has as its main crop, sugar and the resultant by-product molasses, is a first class and cheap material from which to make alcohol.

South America

Argentina normally consumes much more petroleum than it produces, and because of the tanker shortage, has had to sharply curtail consumption, to little more than the domestic production. Whereas Argentina consumption totaled approximately 33,000,000 barrels in 1941 (fourth greatest use among all countries), domestic production in that year was but 22,500,000 barrels and output in 1942 was about the same. Thus the country in 1942 filled only about two thirds of its normal requirements from domestic fields, and currently it probably is forced to curtail use to about two thirds of normal. In efforts to alleviate the petroleum shortage, the government oil company is manufacturing corn briquettes for domestc and industrial fuel use.

Use of producer gas in motor vehicles is increasing in Brazil, because of the shortage of gasoline and the fact that about two years would be required to produce alcohol to meet fuel requirements. In Rio de Janeiro six concerns with combined monthly capacity of 630 units are manufacturing gas-producer apparatus (gasogenes), for commercial use. Ten thousand of these units will be manufactured at a cost of approximately $275 each.

Because of the ocean tanker shortage, Brazil has turned to its own coal deposits for fuel, extracting diesel oil from bituminous deposits. Railroad officials express satisfaction in use of new fuel. In addition to domestic coal, Brazil has been consuming increasing quantities of wood in place of imported fuel.

To alleviate the shortage of motor fuel in Santiago, Chile, 1000 gasogenes are under construction, although scarcity of necessary materials has made priorities necessary. In a recent test, a light delivery truck covered about 150 miles, using but two sacks of charcoal and 1½ liters of gasoline.

Although Ecuador normally exports petroleum, it has developed a shortage of heavy fuel oil for railway and industrial uses, due indirectly to the shortage of rubber. The rubber shortage has led to discontinuance of the use of busses and other motor vehicles, over half the busses in the city of Guayaquil having been forced into idleness for lack of tires. Curtailment of the use of automotive vehicles has sharply lowered demand for gasoline, and with production of gasoline cut down in consequence, there has been available less of residue petroleum. Output of the latter consequently is no longer sufficient to meet requirements. Ecuador in 1942 produced approximately 1,800,000 barrels of crude oil, and the country's own consumption was about 350,000 barrels in 1941.

Within the past year there has been a pronounced decrease in operation of motor vehicles, including trucks, in Peru, because of the shortage of vehicles, parts, tires, and accessories, with a resultant curtailment in consumption of gasoline; although Peru produces petroleum in sufficient volume to export some to other South American countries. Aside from its use of gasoline, Peru consumes substantial quantities of fuel oil, which is the principal fuel for industrial operations, despite the fact that the country has extensive coal deposits, the oil being more economical. Fuel oil is used in power plants and factories in and around Lima, and locomotives also use fuel oil.

Prior to the obstacles imposed by the war, Peru had been rapidly expanding its highway system and thereby creating a market for gasoline. The country spent about 36,000,000 soles on highway construction in 1942, compared with 27,693,000 in 1941 and 15,159,000 in 1940.

Shortage of motor fuel in Uruguay is disrupting bus and trucking company schedules. Kerosine and alcohol are being used as substitutes for seriously scarce gasoline, but since kerosine is the principal cooking fuel of the lower-income groups, this unusual demand has upset the domestic household situation. Horse-drawn vehicles and bicycles both come in for their share of the change, in trying to take care of the reduced passenger-transportation services.

Many countries suffer from shortage of petroleum products as war disrupts normal shipments by tankers. This tanker capsized as she was being towed to port by salvage vessels.
—Acme photo (passed by Navy Censors)

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The Youngstown Sheet and Tube Company was founded in November, 1900 by 47 local investors, with an authorized capitalization of $600,000. In December, 1901, this capitalization had been increased to $4,000,000 to provide for the expanded program decided upon by the men of vision who planned the future of this company.

In February, 1902, 14 months after the initial meeting of the shareholders of this company, the first product carrying the Youngstown trademark was produced. In this same year, these pioneers took the first step to assure complete integration . . . the first producing blast furnace was purchased... the first ore properties were acquired... and the first coal lands obtained. These early acquisitions all served as a nucleus around which was created the great industrial organization, which in later years served mankind in every corner of the globe where products of civilization were making life more complete.

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Industry Must Adopt Cooperative Gas-Injection Programs

Unless industry adopts such programs first, government very likely to require them; so as to increase oil recoveries and conserve gas to alleviate any shortage of petroleum supplies

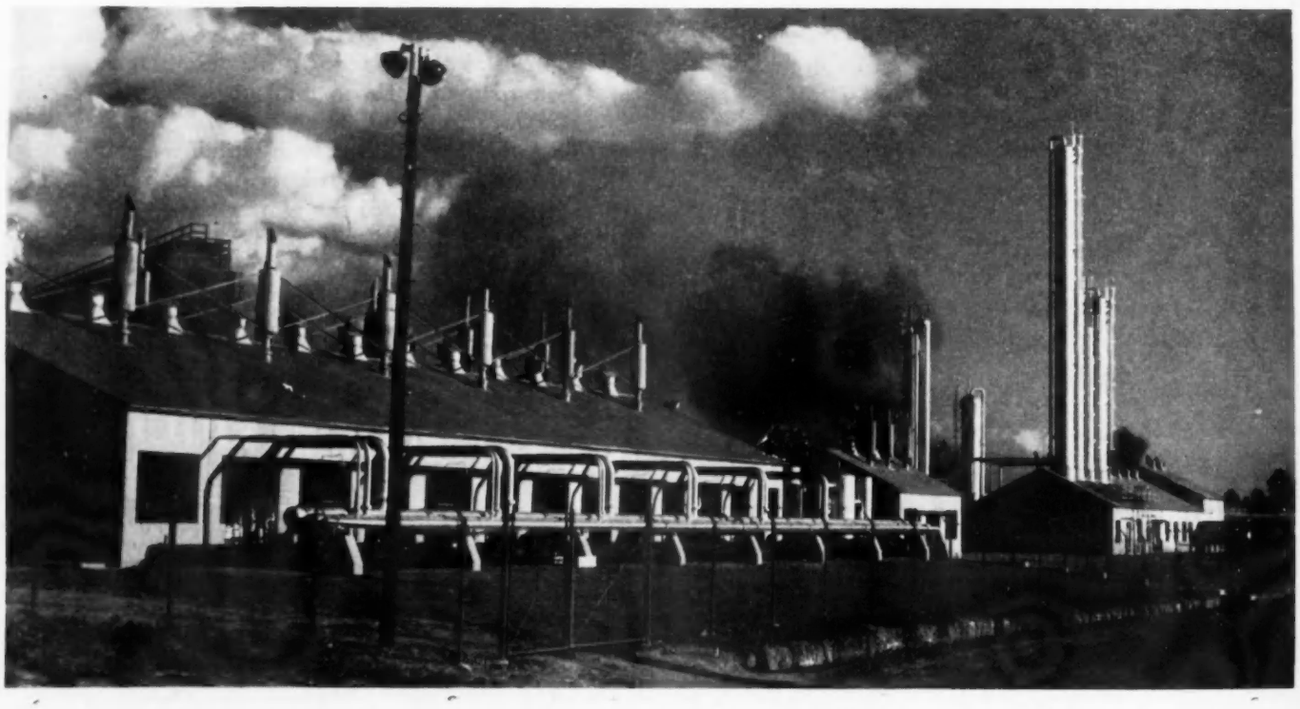
By H. W. HARTS, Vice President,
Warren Petroleum Corporation

THROUGHOUT a large portion of the United States, crude oil has been produced for the greater part of the past century in quantities so large that, at times, it has actually been a drug on the market and has necessitated legislation to prevent actual waste of oil that has been produced. On account of the abundance, methods of production have necessarily not been indicative of the highest amount of efficiency and undoubtedly many millions of barrels of oil have been left in the ground, on account of the methods of producing.

Many oil men have made the statement that when a well is flowing naturally, gas, whose energy forced the well to flow, had then completed its work and was of no further use to the owner of the well. No statement could possibly illustrate a greater fallacy. The energy created by the gas had only been utilized as it had naturally been formed with the oil; and, through the use of compressing equipment, this gas could be made to do the same work innumerable times by maintaining, as closely as possible, contant reservoir pressure equivalent to the pressure existing at the time of discovery. The lack of utilization of this energy has, without any question, caused a loss of petroleum which might very conceivably equal the entire amount which has been produced; and, now that we are faced with shortage of crude oil, operating companies have finally realized that it is not only possible, but economical, to take whatever means might be necessary to preserve the original reservoir pressure as closely as possible.

Back as far as the early twenties, many companies saw the desirability of saving this excess gas and returning it to the producing zone for the purpose of maintaining pressure in this zone—thus increasing not only the production of oil but enhancing the future reserves of the structure.

The federal government finally became cognizant of this potential increase in our national oil reserves and gradually became more and more insistent that repressuring programs be practiced where oil was taken from government lands. The Osage country of Oklahoma and the southeastern portion of New Mexico are two examples of well laid out repressuring programs which were at least in part directed by the federal agencies. The estimates of benefits from these various repressuring programs vary from 20 percent increase to as high as 100 percent increase over the amount of petroleum which might have been produced, had there been no re-



This gasoline recovery and residue injection plant is repressuring five pay horizons in three fields—Griffin, Ind., New Harmony, Ill., and Calvin, Ill.

The COSMOPOLITE DRILLER*

Near Old Oran, on Sahara sand,
He "dug" a wildcat hole;
Then at Algiers, in recent years,
He played the driller's role.
With an Indian tribe on the towering side
Of Santa Maria Hill
He pushed the bit in a worthless pit
That's wrecked in Colombia still.
The tropical heat has a blistering beat
For work in Bolivian wastes,
And the white man's toil diggin' Pampa soil
Don't please even drillers' tastes.
By boat from Rio to Rosario
Is the only course for man;
From there they go, on a slow burro,
Up the trail to Tucuman.
'Tis a grand old scene in the Argentine
With jungles and hills galore,
But it's pure dee hell to drill a well
With nature paddin' the score!

*This, our tribute to drillers we've been privileged to serve in remote parts of the world for nearly half a century, was taken from a story in *The Oil Weekly* of March 30, 1928. Venezuelan scene photographed by Robert Yarnall Richie. Character posed by Hubert Rodriguez of Sulphur, Louisiana.

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pressuring throughout the life of the producing wells.

This program should not be confused with so-called "recycling" operation, where the natural formation pressure is reduced only slightly in extracting all available hydrocarbons, but should be compared with ordinary oil production operations in which all available gas is taken from the oil as produced and compressed to a pressure sufficient to permit it to re-enter the producing body of sand. This procedure, of course, requires many times the compressor horsepower, per unit volume of gas handled, than does the "recycling" plant; and, whereas the "recycling" plant is the entire source of revenue in the area in which it operates, the repressuring plant permits the units of oil production to operate as separate entities and derives its income solely from the products contained in the gas handled.

Since the government is continually assuming more and more control of the production of oil; and, since the recent trend has been continually toward conservation in general, and pressure maintenance in particular, it is possible (and even probable) that within the near future no new oil production will be permitted without first making preparation for the utilization and conservation of all gas produced in conjunction with the production of oil.

The reporting and control of oil-gas ratios, the studying of South American practices and the record of both increased production and reserves, due to repressuring and pressure maintenance, are all facts that are indicative of the trend toward regulation of reservoir pressure and the prevention of the waste of gas.

Legislative Trend

The recent Batson bill, in the Oklahoma legislature, shows the interest now being taken by the state in the control of reservoir pressure; and, regardless of the defeat of this particular bill, there will undoubtedly be others following which will, in time, force the oil operator to conserve all the available natural gas. Recently, the federal agencies have refused priorities in several instances until a mutual repressuring program was worked out between all of the operators in the area, with one operator or natural-gasoline manufacturer pushing the entire procedure. In cases where one large company, which might be interested in natural gasoline and its by-products, also operates producing properties in the area, the entire scheme is rather simple, in that the large producer merely puts in his own repressuring system and the percentage of ownership is large enough that the program will be a success. When the producing area is cut up among small owners, none of whom are desirous of going to expense of installing a common pressure-maintenance system, these companies may desire an outside, disinterested party to handle the pressure-maintenance system. This is where the natural-gasoline manufacturer may be of some benefit in that he is interested not in the production of oil but in the recovery of gas and the products which can be manufactured from this gas.

Past Practice

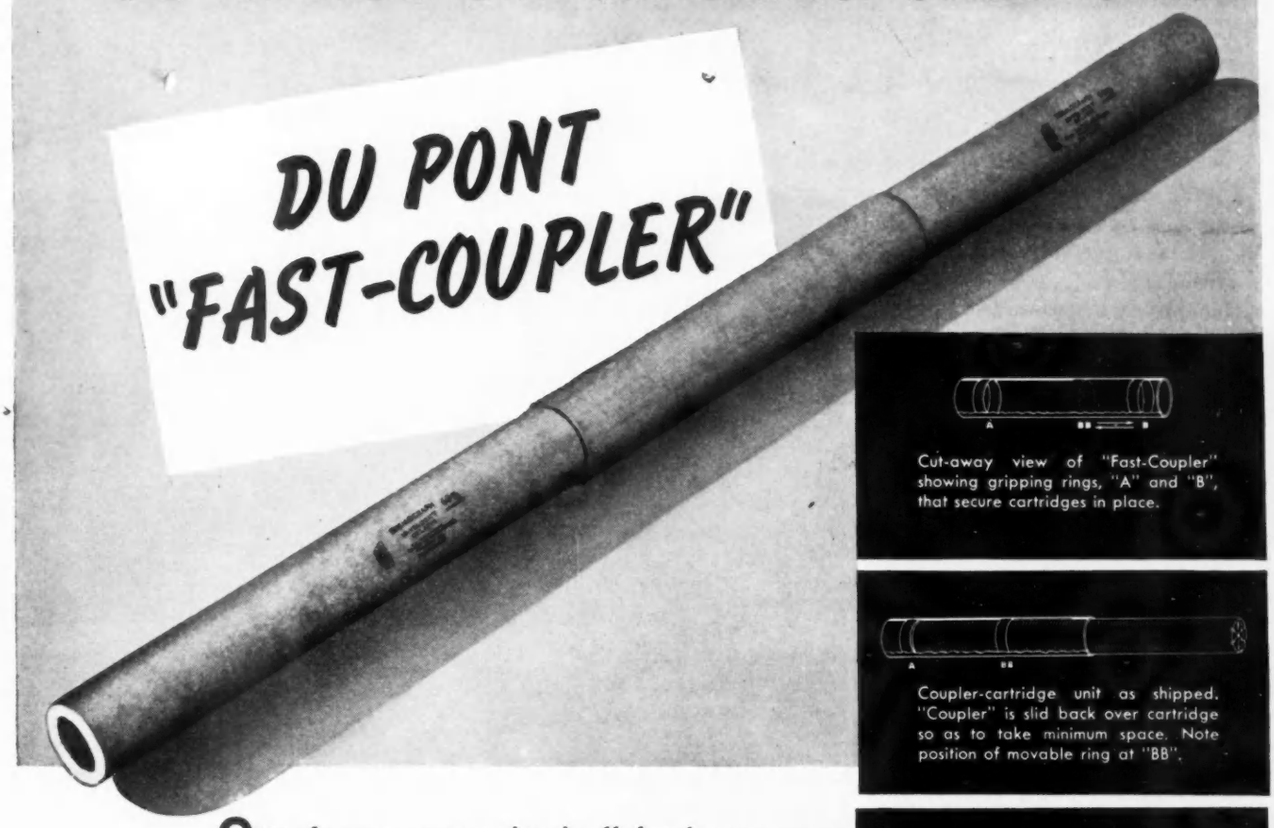
In the past, the natural-gasoline manufacturer merely laid lines to the various producing wells, transported the gas to the manufacturing plant and returned a sufficient amount of gas to the various producers to operate their leases. These producers were interested in the plant operator only for two reasons—the first being any income derived from the sale of the gas and the second being the availability of gas under sufficient pressures to operate lease equipment. The changing conditions in operation have caused the natural-gasoline manufacturer to assume a different role in that the producers look to the plant operator to coordinate the operators and to arrange a satisfactory plan between these operators for the repressuring setup. The plant operator, even prior to construction of the plant, will contact each producer in the area and arrange with him a suitable plan for the successful culmination of the conservation effort. He will then construct his plant and lay the necessary high-pressure return lines to the various leases and wells which have been previously designated by the owners of the lease. He will install meters, dehydrate the gas and deliver it to the input well. The producers, in the meantime, will have arranged a repressuring association among themselves and will have appointed a committee to be responsible for injection of the gas into the wells. This committee, in turn, will hire a petroleum engineer who will be employed, not by the repressuring plant but by the producers and it will be his duty to make a just and fair distribution of the returnable gas to various wells used for the maintaining of the reserve pressure. This engineer actually acts as a coordinator between the gasoline-plant operator and the various lease operators and also is responsible, to a large extent, for the success of the venture.

A large percentage of the materials, to make 100-octane gasoline, come from hydrocarbons contained in natural gas, and also many other products used extensively in the war effort. In many instances, the entire repressuring program may cost as much as three million dollars, of which a fair proportion pertains to the producing companies and from which the natural-gasoline derives no direct benefit. For this reason, it would obviously be impossible for the plant owner to stand the entire expenditure. At this point, the cooperative pooling of properties commences and a mutual agreement is entered into between the gasoline manufacturer and the producer whereby each producer will stand his share of a portion of the necessary expenditures. There are several ways that this pooling can be worked out, but one of the simplest is to have the gasoline plant operator own and pay for all of the equipment normally necessary for the production of the various products made in the natural gasoline plant, and all extra expenditures and equipment necessary for repressuring to be divided equally among the leaseholders. Each producer, after paying his pro rata share, will, in turn, own certain equipment which would revert to him at such time as the repressuring program and the production of oil ceased, but would necessarily be entirely under the jurisdiction of the plant operator while the program was in existence. This procedure not only tends to equalize the necessary cost of the project, but also tends to increase the interest of each operator in the repressuring program, inasmuch as he owns a certain amount of the equipment necessary for the successful culmination of the plan. Cooperative deals, similar to this, have been worked out in various places in the Mid-Continent area and more recently in Illinois; and, as yet, have all been successful, even above the original expectations of the participants.

Many men interested in the production of oil, and even some petroleum engineers, undoubtedly think that some of this procedure may verge on socialistic tendencies, but the recent trend of oil production and the conservation of gas all leads in this direction and the first indication of an actual shortage of petroleum in the United States will undoubtedly precipitate legislation partially following these lines which, in turn, will have more than a minor bearing on the future producing practices in this country. If a sufficient number of operators in new producing areas take steps to conserve their resources and prevent waste and loss of production, then they will undoubtedly be permitted to produce their properties as they have in the past; however, if the wasteful practices are continued, in all probability either state or federal agencies will step into the picture and tell the companies or individuals, interested in oil production, how and when they will be permitted to operate their various producing properties.

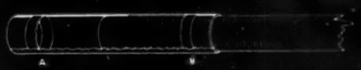
New! FASTEST, SUREST WAY TO MAKE UP SEISMIC CHARGES

DU PONT "FAST-COUPLER"

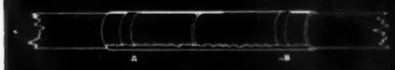


Cut-away view of "Fast-Coupler" showing gripping rings, "A" and "B", that secure cartridges in place.

Coupler-cartridge unit as shipped. "Coupler" is slid back over cartridge so as to take minimum space. Note position of movable ring at "BB".



"Coupler" pulled out ready for second cartridge to be inserted at left-hand end to make up charge.



A two-cartridge load. "Coupler" gripping rings, "A" and "B", securely hold both cartridges in place.

ONE, fast, easy operation is all that is necessary to join dynamite cartridges together with the new Du Pont "Fast-Coupler." Just push the extended end of the "Coupler" over a second cartridge until movement is completed. It takes but a fraction of the time required by former methods of assembling a seismic charge.

In addition to speed, the "Fast-Coupler" assures a charge which will remain intact even under the most adverse conditions of lowering or poling. This reduces to a minimum the possibility of losing part or all of the load.

Today, with manpower a problem and the need for speed more urgent than ever before, every crew chief should look into this quicker, surer way of preparing charges.

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"FAST-COUPLER"

IT WORKS FAST . . . IT HOLDS FAST

Concrete Linings May Make Old Lease Tanks Usable

By FRANK B. TAYLOR, Staff Writer

CONCRETE applied as coating on the interiors of stock tanks is under field tests on Gulf Oil Corporation's Rhodes lease in Glenn Pool, Oklahoma. As the work is of recent date, a time test has not been possible for this use of concrete as applied to oil-field storage; however, in other industries, comparable applications of concrete have proven satisfactory. Humble Oil & Refining Company and Standard Oil Development Company have used concrete coating on walls and roofs of refinery storage where particular problems were encountered.[1] Similar applications made by The Texas Company in lining tanks have been satisfactory.

Immediate benefits of the use of a concrete lining within field tanks is determined from the conditions making the work desirable. Protection against corrosive crude on formation fluids is one immediate result, while another is the strengthening of old tankage nearing the salvage stage, thereby prolonging their service life. Other field requirements may be met with equal satisfaction. Currently, a concrete lining is one approach to the highly important problem of saving critical materials.

The economics of this use of concrete are dependent upon the advantages to be derived as compared with actual results obtained, not all of which might be immediate. The volume of this type of work done has considerable to do with the total cost per tank and even more to do with the per-foot-of-coverage cost. Moving time between individual jobs and the necessary interval of delay between jobs are factors influencing the initial cost. Whatever conclusions are drawn they should anticipate charging off as total loss all tanks so treated at the expiration of their usefulness at the site, for it has not been found practical to attempt moving treated equipment to new locations. In cases where the application was being made to tanks about to be condemned, such loss should already be assumed to have occurred.

Concrete lining properly applied has been used for years in other construc-

Top: With reinforcing applied to both the sides and floor plates of a bolted tank, the application of a concrete coating to the interior of the tank is commenced.

Center: The concrete coating just covers the reinforcing, as indicated by the ridged appearance.

Right: A finished concrete coating, including the flash coat. Concrete has been cut off at the top where it overlapped the edge, so that the shell-deck seat will be uniform.

Three bolt-and-nut delivery problems solved

I was in a rush for a special size and type of bolt and nut. When it didn't look like I was going to get what I wanted, I talked with a Bethlehem engineer. He showed me how a standard-sized bolt and nut would do the job just as well. I changed my order and got delivery today!

We'd always ordered alloy-steel studs for a cover plate in one of our high-pressure jobs. Never thought of using anything else. Then a Bethlehem engineer showed us how we could get quicker deliveries, just as good results, and also help save critical materials, by using heat-treated carbon steel instead.

It hurts production to have to wait, as we had, for special bolts and nuts machined from the bar. Now, through Bethlehem, we've found out there's many an opportunity to substitute standard fastenings made on regular bolt-making machinery. In that way we're saving money as well as delivery time when every hour counts.

There are lots of places where special fastenings are essential, and nothing can be done about it. But there are also many places where fastenings of special sizes or of alloy steels are being used, and where "standards" could be substituted, with a saving of time, money and critical materials. Perhaps you could replace some or all of the special fastenings you are now using with standard items. A Bethlehem engineer will be glad to advise you. There's no obligation, of course. Simply call your local Bethlehem representative today.

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tion, as a means of repairing damage, or for added life or usefulness. A chief drawback has always been the cracking of the lining as a unit, or away from the base upon which it has set. The use of reinforcing has all but eliminated the former objectional characteristic in industrial applications[2] and the use of pneumatic pressure has resulted in a base-to-concrete bond to practically eliminate the latter.

In maintenance of applied lining there is nothing prohibiting the use of patching to repair damage. Tests have indicated a high bonding strength between normal concrete and pneumatically placed concrete. Also, a high strength is to be observed between metal and the placed concrete. Upon occasion it is necessary to interrupt the placement of the lining, and while it has been suggested that such could result in a seam, such has not been detected; the bond between the fresh coat and the old apparently being highly intimate. This fact, at least in part, is due to the greater density of pneumatically placed concrete as compared with the normally worked material.

The Mechanical Application

The first and primary step of importance in applying concrete to a receiving surface is to thoroughly clean that surface. Tanks must be completely drained, hosed and sand blasted whereever a bond is to be obtained. Failure to do so will result in poor bondage and subsequent falling away of the lining. Also, where a liquid is handled, a permeable seam can result between structure and applied concrete. Mill scale, although not ordinarily found except on new construction, must be removed.

Having obtained a clean working surface, the reinforcing is placed in position within the shell of the tank, over the floor, and is suspended from the underside of the deck if the roof is to be cased. Reinforcing for the normal job is 2-inch by 2-inch No. 12 wire mesh. On bolted tanks this mesh is supported from bolts, loosened, then tightened after receiving a wire support. On welded tanks or on structures with a plain surface, a small hook can be spot welded in place for adequate support of the reinforcing material. Experience has shown that the reinforcing should stand away from the surface to be cased a distance equivalent to about half the thickness of the lining to be placed. In the case of a 250-barrel stock tank, which is cased to 1½ inches, the shell-to-reinforcing distance should approximate ¾-inch.

Any nipples into the tank; drains, or other fixtures not to be covered, must be protected. It is well to place a rag plug in any open connections. Where a nipple into the tank will not extend through the application of concrete, it is necessary to lengthen the nipple prior to the work.

A good grade of cement is necessary for the operation, and the sand must be clean, dry, sharp and free of deleterious material, and of "torpedo" or similar grade. These stocks are preferably mixed by hand in ratio of 3-to-1, and are then screened if necessary. The mix is placed in a cement gun and fed to a nozzle control by compressed air at 60 pounds pressure. Water, at a rate of about 3½ gallons per sack of make-up, and at a pressure exceeding the air pressure by about 10 pounds, is mixed at the nozzle. The process requires about 225 cubic feet of air per minute of operation.

The operator directs the flow against the surface to be cased at as near a right angle as possible. The concrete is fed on uniformly in much the same manner as a weld is applied, only much exaggerated. Some operators apply the concrete from the roof down to the floor, others prefer to build the case up from the floor. In doing work on a roof, it is often necessary to use a special bonding material, in place of the sand, as a means of reducing the weight. This makes the operation of flowing the concrete against the exposed metal more exacting for then the discharged material moves with reduced striking and adhering power. Also, roof coats have been applied in other construction in stages, allowing a thin initial coat to partially set before applying a second coat.

In jobs, wherein a large dome area has been surfaced, reinforcing columns have been used, and these, also, have been sheathed with concrete. An ordinary 4x4-inch wood support can be erected from the bottom foundation to the dome, encircled with reinforcing mesh, and cased completely with concrete. Steel columns, coated or not as deemed necessary, may serve as added support where required.

There is a surplus "fall" of concrete to the floor during operations either on the walls or underside of the deck. This must be cleared from the bottom and discarded. The application on the floor, which is likewise reinforced thoroughly, is generally to a slightly greater thickness than upon sides and top.

While it is possible for a capable and experienced operator of a cement gun to place a case to a plus or minus ¼-inch tolerance, there are usually some humps or low spots to be corrected. Consequently, the operator cuts off any uneven spots as soon as the total desired thickness is obtained while the application is still wet, and flows on a flash coat as a finish. At the top of the tank sides, the excess concrete which has built up over the edge of the shell, is cut off with a trowel so that a correct seat is obtained with the deck.

As a finish to the job, the concrete is cured for 24 to 48 hours by sprinkling. In some cases a longer curing time has been used although practice fails to indicate any necessity for the greater period.

The Time Factor

Availability of materials, including clean water and either a compressed air source or a compressor, may have much to do with total time of preparation for applying concrete to tankage. Also to be considered is the "out-of-service-time" required for each tank. In a battery it is possible to take the tanks in turn, stocks being handled through those not out of service. In the case of a single tank some additional oil-handling facilities may be necessary.

Actual time required to place the concrete on a 250-barrel tank is only about 4 hours. The total job; sand blast, reinforce and shoot, requires about 14 hours. The cure of the concrete takes from 24 hours up as determined by the operator. In the case of a battery, a minimum time interval between jobs reduces total cost and the time required per tank is similarly reduced through having no required moves.

Conclusions

Two primary objectives are immediately realized from casing tank interiors. The first of these is the return to efficiency of a tank that is old and approaching abandonment. The second is the protection of the tank against corrosion as offered by the inactive coat. Materials not available or otherwise required, are freed by this method of reconditioning stock tanks. From the limited data available resulting from experience referred to, it would appear that this method of tanks maintenance is entirely feasible and of broader application in the field.

In actual cost, derived at from past work and contingent upon the factors previously mentioned, total cost of a casement job may range from 50 percent to 100 percent of the cost of new equipment. The higher bracket particularly applies to the smaller tanks where the per-foot cost is greatest. Per-foot cost varies from 35 to 45 cents in place, with the floor the least costly and the dome the most. Economical justification of this method of lengthening or restoring the life of steel tankage is apparent.

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[2] J. A. Greene, Engineering News-Record, Sept. 25, 1941.

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After the dramatic sea battle, the cutter "Spencer" flashed this victory message to ships in the convoy which it had protected: "Scratch one hearse." (In Navy lingo a U-Boat is called a hearse.) That Cameron Depth Charge Throwers have helped send another enemy U-Boat to the bottom is of immense satisfaction to our entire personnel.

CAMERON IRON WORKS, INC., Houston, Texas

Synchronized Gas-Lift System Levels Compressor-Plant Load

By T. H. RODGERS,
Petroleum Engineer, Chanslor-Canfield Midway Oil Company, Ventura, California

Separate high-pressure kick-off header and synchronous motor-driven intermitters permit balancing of lifting load in well groups so as to maintain average pressure head with fluctuations held to within five percent of working rating. Computation of typical well pairs shows method of applying maximum lift with minimum gas input

BY PAIRING wells so that input gas goes to only two units at any one instant, and grouping these pairs so as to keep gas demand as even as possible from pair to pair, it is possible to plan the layout of a gas-lift installation which will have uniform gas demand, and from which will result a uniform main-line pressure. Distribution of gas to the individual well is then determined through an intermitter-time scale which will produce best results; well data being correlated with that of other wells so as to adhere as closely as possible to the predetermined optimum condition in which but two wells are on input simultaneously. The use of synchronous motor drives for the intermitters permits maintenance of such a closely regulated time-flow cycle, once it is established.

Through computations for all the wells on the system, and by installing a separate high-pressure main for kick-off purposes, gas-lift equipment was installed in the Rincon field, Ventura County, California, 15 years after the opening of the field. Only 5 of the 9 months during which the system has been in operation have the lifts operated at 100 percent of capacity.

On an individual-well basis, experience in this field shows that best results are obtained from gas lift when three physical conditions are met: first, the static pressure should be high and exhibit a fairly flat decline curve; second, the formation gas-oil ratio should be around 1000 cubic feet per barrel or more; and third, water cuts should not exceed 20 percent.

Some water shut-off programs depend upon good cement contact with thin shale bodies to protect producing sands below. When producing a well under such circumstances it is often thought desirable to hold a back pressure against the formation to prevent excessive sand movement into the liner such as occur with large pressure differentials across the sand face and high fluid velocities, and so prevent the thin shale from caving.

This is easily done in gas-lift work by placing a choke in the surface tree to hold any amount of tubing pressure.

Facility Layout

Figure 1 is a diagram of the mechanics of gas distribution. With a 30-pound intake and average discharge pressure of 400 pounds per square inch, the compressor plant is capable of 2-stage compression of 3,000,000 cubic feet per day for gas-lift purposes; 1,800,000 cubic feet is handled by an 8-cylinder, 300 horse power, gas-driven compressor, and 600,000 cubic feet is obtained from each of 2 125-horse power electric-motor-driven compressors.

Compression is 2-stage throughout with intercooling only necessary in the case of third stage, kick-off, high-pressure work. Each compressor cylinder is equipped with an outside pop valve to relieve at cylinder capacity, and one main-line relief valve provides extra security.

All engine-and compressor-jacket water is circulated in a closed system and cooled by a radiator-type fan cooler.

Gas circulated is wet gas from field well separators, with production above that recycled in the closed gas-lift system going to the absorption plant.

Leaving the plant are two parallel distributing lines which after a steep climb of 900 feet enter parallel 1½-mile field headers from which all wells handled take their gas. This form of ditribution is made necessary by the long narrow anticline from which production is obtained. The low-pressure header has a 1000-pound maximum pressure, is of 5-inch pipe, and provides considerable

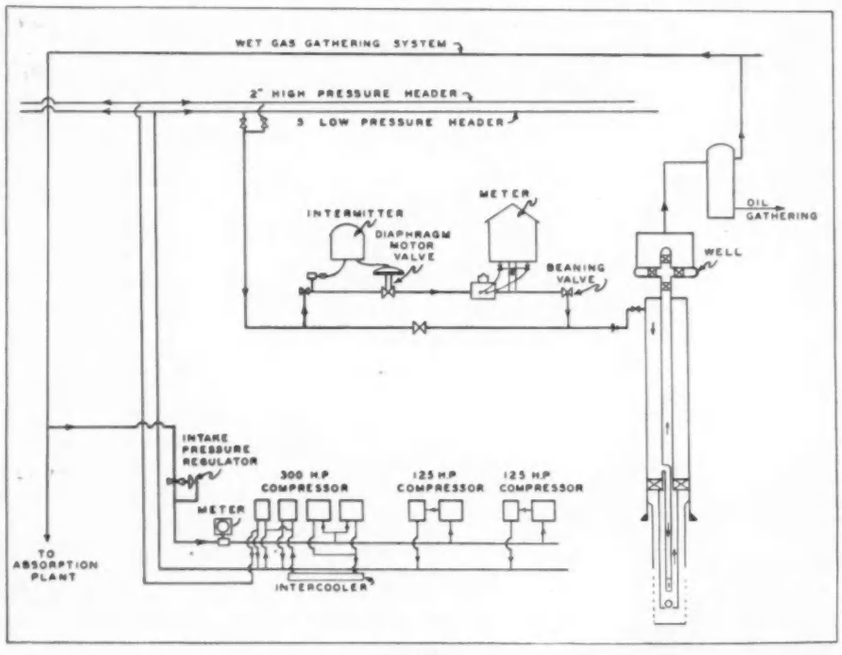

FIGURE 1
Gas-lift flow diagram

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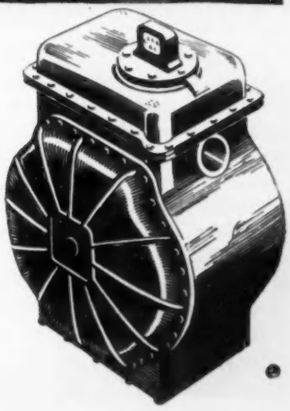

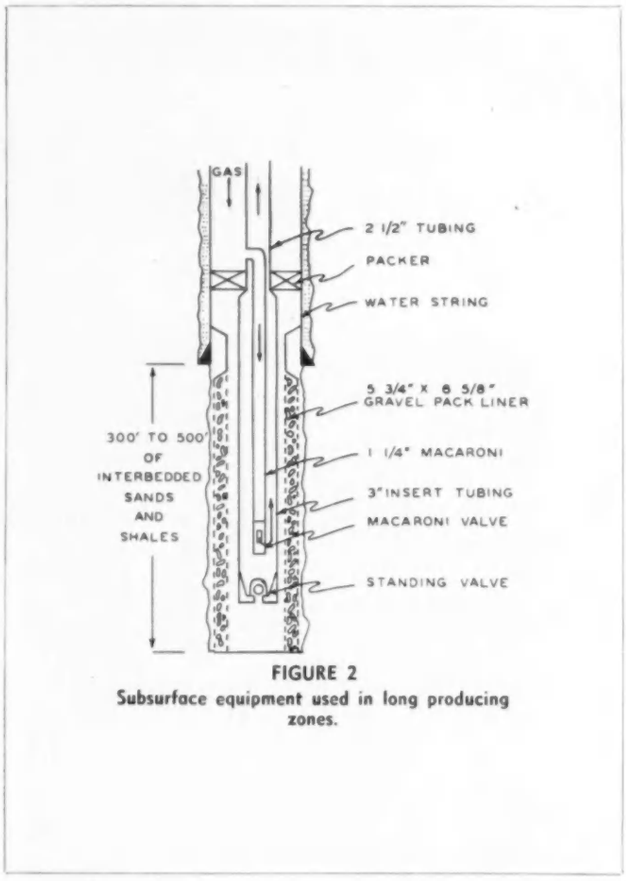

FIGURE 2
Subsurface equipment used in long producing zones.

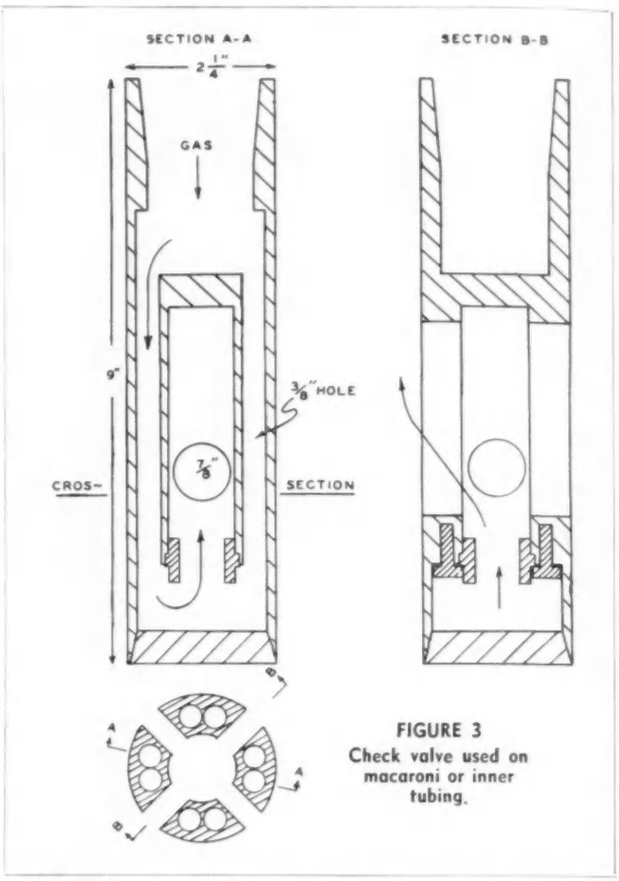

FIGURE 3
Check valve used on macaroni or inner tubing.

storage. The high-pressure header is of 2-inch pipe tested to 1900 pounds.

A single 2-inch feeder line runs from each well and is tied into both headers. Kick-off gas pressure is obtained at the plant by diverting the discharge of a 3½-inch compressor cylinder from the 5-inch line to the 2-inch line which otherwise remains dead, and by taking suction from either first- or second-stage compression headers.

Four block gates in the 5-inch line spaced at regular intervals and a short connection from the 2-inch to the 5-inch line within each blocked area make possible the isolation of any section of the 5-inch for repairs, without killing the entire system.

Before gas enters a well it first passes through an intermitter system located at the well site. This intermitter—meter run, seen in Figure 7, is on a by-pass and consists of two reducing regulators that supply 17-pound gas to an electric timer, a diaphragm motor valve actuated by 17-pound gas from the timer during "on time," a meter run and orifice fitting downstream from the intermitter valve, and a valve at each end of the by-pass suitable for choking purposes. Injected gas then passes through a check valve and into casing or tubing depending upon the gas-lift device used. Some kind of dual tubing string is necessary for gas lifting from near the bottom of a liner. This may be either two complete strings from the surface, or as in Figure 2, a short dual construction below a packer set near the top of the producing zone and using a connection at the top of the inner string to pass injected gas from the casing to the inner string. At the bottom of the outer string is a check valve, and a specially designed check valve is placed on the end of the inner or macaroni string. Its design as seen in Figure 3 is such that gas passing downward through the valve is reversed in direction within the valve so that it can be directed upward against a stainless-steel ball and seat. The ball is raised and gas passes out of the valve into the oil chamber between the tubing strings. A schematic representation of the process is as in Figure 4. The operating importance of this valve will be seen later.

Synchronized Operation

Since 9 or 10 wells take gas from the 5-inch header, some scheme must be used for the efficient distribution of the total circulated volume, and that encompasses a number of problems: Sufficient header pressure must be maintained to handle the well with the highest circulating pressure, at the same time avoiding excessive header pressures that reduce compressor efficiency. Good plant operation needs a constant discharge pressure, or load, with not over 100 pounds variation during any 10-minute period, but field operation calls for delivery to widely varying circulating pressures. Intermittent gas injection produces more oil in some wells than does continuous lift, which means that from a common header gas will go to only a few wells at any one time. It also means that the relationship between "on-time" and "off-time" will change from well to well in accordance with experimental results. In general, clean wells will perform adequately with widely spaced gas injections, whereas wet wells, cutting 30 to 40 percent or more, improve in production with closely spaced injections that may even approximate continuous lift.

To meet field demands on the one hand, and compressor-plant requirements on the other, the intermitter system of gas distribution is the best solution. It enables the operator to maintain an average of 400 pounds, with 20 pound fluctuations, on the 5-inch line and serve wells that vary in circulating pressure from 180 to 290 pounds.

Each intermitter is synchronous-motor driven so that when all intermitters are set to work as a unit, they do not change step and get out of time as do the spring-driven variety. Nor do they depend on the human element

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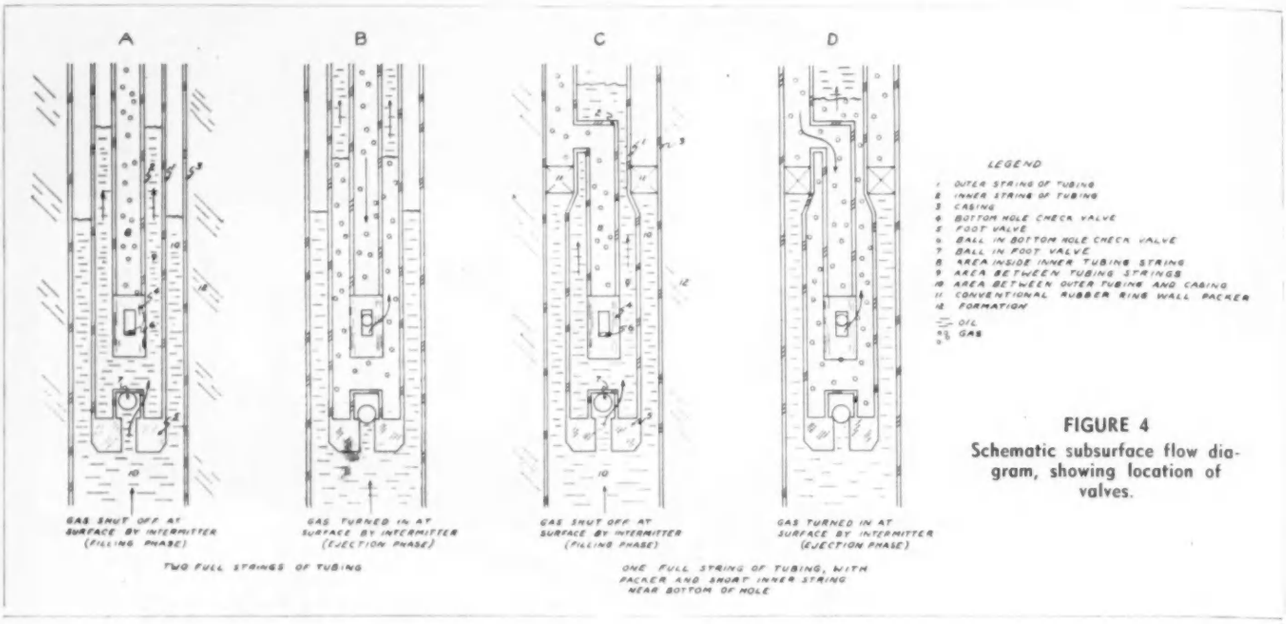
A
B
C
D
LEGEND
1. OUTER STRING OF TUBING
2. INNER STRING OF TUBING
3. CASING
4. BOTTOM HOLE CHECK VALVE
5. FOOT VALVE
6. BALL IN BOTTOM HOLE CHECK VALVE
7. BALL IN FOOT VALVE
8. AREA INSIDE INNER TUBING STRING
9. AREA BETWEEN TUBING STRINGS
10. AREA BETWEEN OUTER TUBING AND CASING
11. CONVENTIONAL RUBBER RING WALL PACKER
12. FORMATION
OIL
GAS
GAS SHUT OFF AT SURFACE BY INTERMITTER (FILLING PHASE)
GAS TURNED IN AT SURFACE BY INTERMITTER (EJECTION PHASE)
GAS SHUT OFF AT SURFACE BY INTERMITTER (FILLING PHASE)
GAS TURNED IN AT SURFACE BY INTERMITTER (EJECTION PHASE)
TWO FULL STRINGS OF TUBING
ONE FULL STRING OF TUBING, WITH PACKER AND SHORT INNER STRING NEAR BOTTOM OF HOLE

FIGURE 4
Schematic subsurface flow diagram, showing location of valves.

for winding. Almost any period of "on-time" followed by any period of "off-time" can be worked out for a well or series of wells, and the operator soon learns through trial and error the specific gas and time requirements of any one well.

Figure 5 is a time scheme table used in the Rincon field for several months during which time 8 wells were on the line, and the compressor plant was operating at 83 percent of capacity. Let us assume that we are changing to this schedule and see how the actual field adjustments are made.

First the entire cycle time is decided. Thirty minutes is convenient because it corresponds to the 30-minute hand on a stop watch. Then the wells served are listed as shown under "Individual Intermitter Time," and opposite "M. C. F." is placed the corresponding gas volume desired for each well. This figure the operator knows from previous gas-lift records of the well, or by analogy if the well is a new one.

We now decide to have gas go to only 2 wells at any one instant, so the wells are grouped in pairs with the thought in mind that if the gas demand is kept as even as possible from pair to pair during the cycle, a uniform main line pressure will result.

The pairs are then listed horizontally as shown under "Intermitter Cycle," and a specific number of minutes of gas injection time is assigned to each. Notice that 2 wells are to receive only one shot of gas of 4½ minutes every 30 minutes.

Each well can then be given an individual intermitter-time scale to be used in the field for setting the time lugs on that parcitular intermitter. For example well 12, by looking down the "Time-On" column, is seen to be on for 3 minutes, off for 5½, on for 3, off for 5½, on for 3, off for 10. Total time on during the 30-minute cycle thus amounts to 3 periods of 3 minutes each, or 9. The decimal equivalent of 9/30 is .30, or in other words gas time into the well equals .30 of continuous flow. Similar data is worked out for the other wells and also listed.

Next the m.c.f. desired is shown for each well, the total being the volume of gas required from the compressor plant. Previous experience may show this summation to be consistently less than the measured plant volume, due to errors in gas measurement at high temperatures and pressures. If so, this difference is added in.

Computation of the "Static" and "Differential" columns is as follows: The highest operating well pressure we know to be 290 pounds and we decide to carry a line pressure 80 pounds above this, or 370 pounds at the well. Friction losses bring this figure to 415 pounds at the compressor plant.

INTERMITTER CYCLE

WELLS	12–17	16–12	28–33	13–17	16–12	28–33	13–17	16–12	28–33	31–38
TIME ON	3	3	2 1/2	3	3	2 1/2	3	3	2 1/2	4 1/2
TIME SCALE	4/9	4/9	8/11 5	11 1/2/16 1/2	11 1/2/16 1/2	14 1/2/19	11/20	22/33	33 1/2/25 1/2	33 1/2/30

INDIVIDUAL INTERMITTER TIME FROM ABOVE

WELL	12	13	16	17	28	31	33	38
TIME ON	3	3	3	3	2 1/2	4 1/2	2 1/2	4 1/2
TIME OFF	5 1/2	5 1/2	5 1/2	5 1/2	8	25 1/2	8	25 1/2
TIME OFF	5 1/2	5 1/2	5 1/2	5 1/2	8		8	
TIME OFF	10	10	10	10	10 1/2		10 1/2	
TIME OFF								
TOT TIME ON	9	9	9	9	7 1/2	4 1/2	7 1/2	4 1/2
DECIMAL	.30	.30	.30	.30	.25	.15	.25	.15
STATIC	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
DIFF	4.2	7.3	6.2	5.5	4.2	8.1	4.3	7.8
M.C.F.	270	485	400	350	225	260	230	250

FIGURE 5
Table of synchronized time settings and gas volumes as used in the field.

Translating 370 pounds line pressure to chart readings, it is evident that gas meter static pens will read around 6.20 on gas charts since:

$$\frac{(\text{Static reading})^2 \times \text{spring size}}{100} - 14.7 = \text{gauge pressure}$$

then

$$\text{Static reading} = \sqrt{\frac{(370 + 14.7) \times 100}{1000}} = 6.2$$

Well 12, according to Figure 5, requires 270 m.c.f. in a 24-hour period. It is seen that this will be at a static reading of 6.2. With a predetermined meter coefficient, it is only necessary to determine the differential reading to complete all the factors necessary for a field setting.

Twenty-four-hour gas-volume calculations ordinarily are the product of the differential and static readings times the coefficient, but that presupposes continuous flow. In this case the meter registers for 3 minutes, is off for 5½ and so on. The true differential reading then becomes a fraction of the peak reading obtained from the chart, which is the extremity of the differential swing, and that fraction is the amount of "time-on" during a 30-minute cycle. As seen, well 12 had a total time-on of 9 minutes out of 30, which as a decimal is .30. If the differential swing on each head is out to 6.00, then the true differential for gas volume calculation becomes $6.00 \times 30 = 1.80$.

Working backwards, the necessary field differential setting for the problem considered is found by:

$$\text{Differential} = \frac{270}{6.2 \times 34{,}500} \div .30 = 4.20$$

In similar fashion, the values of all

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In addition, the Williams' line also includes the "Vulcan" Vise Stand —a complete unit combining Vise, Stand and Pipe Bender. A description of the construction and utility features of these Vises is given here to facilitate selection of the most efficient type for any specific service.

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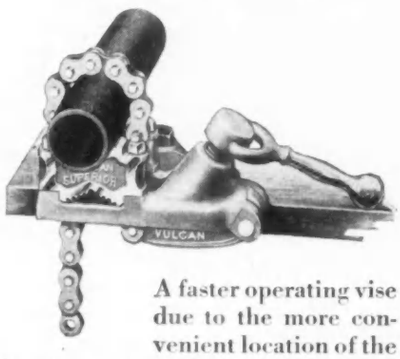
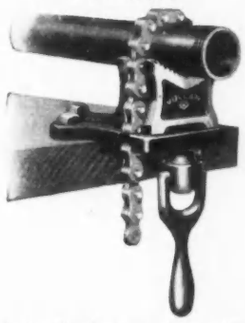


A faster operating vise due to the more convenient location of the handle on top of vise and above the bench. This vise also has reversible jaws, which double the service life of the tool. "Vulcan Superior" has one half inch larger capacity than other chain vises of corresponding size. Made entirely of tough wrought steel with drop-forged base, jaws, handle and chain arm. Available in two sizes, for pipe 1/8″ to 4-1/2″.

"VULCAN"



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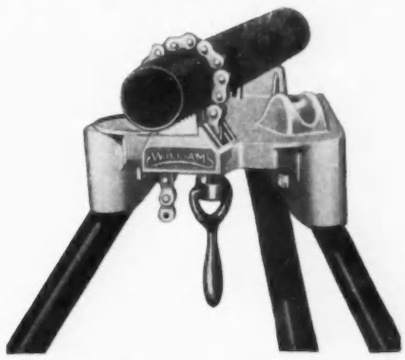

A 3-in-1 unit combining Vise, Stand and Pipe Bender. The high-grade malleable iron base, designed for severe service, is equipped with oil can recess, tool slots, and rear pipe support. The Pipe Bender handles pipe up to 3/4″. For easy carrying, legs fold and secure with tie chain. Vise parts are interchangeable with "Vulcan" No. 1. Made in one size only, for pipe 1/8″ to 2″.

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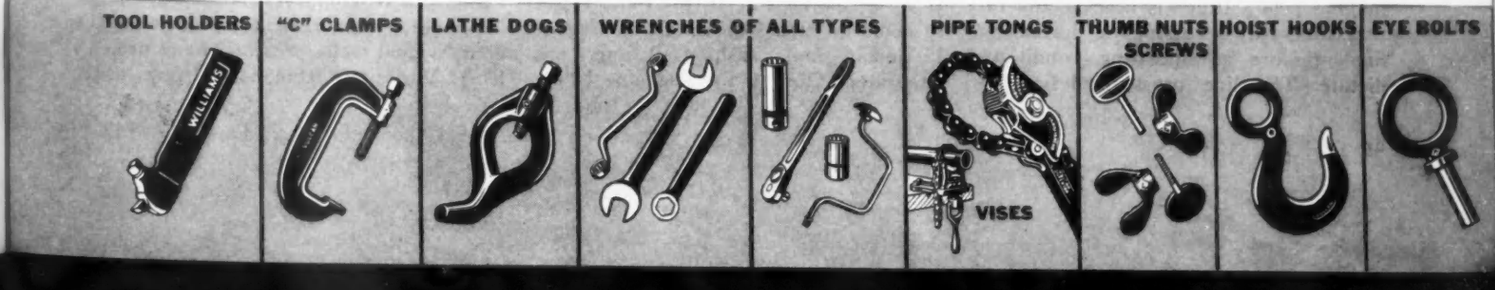


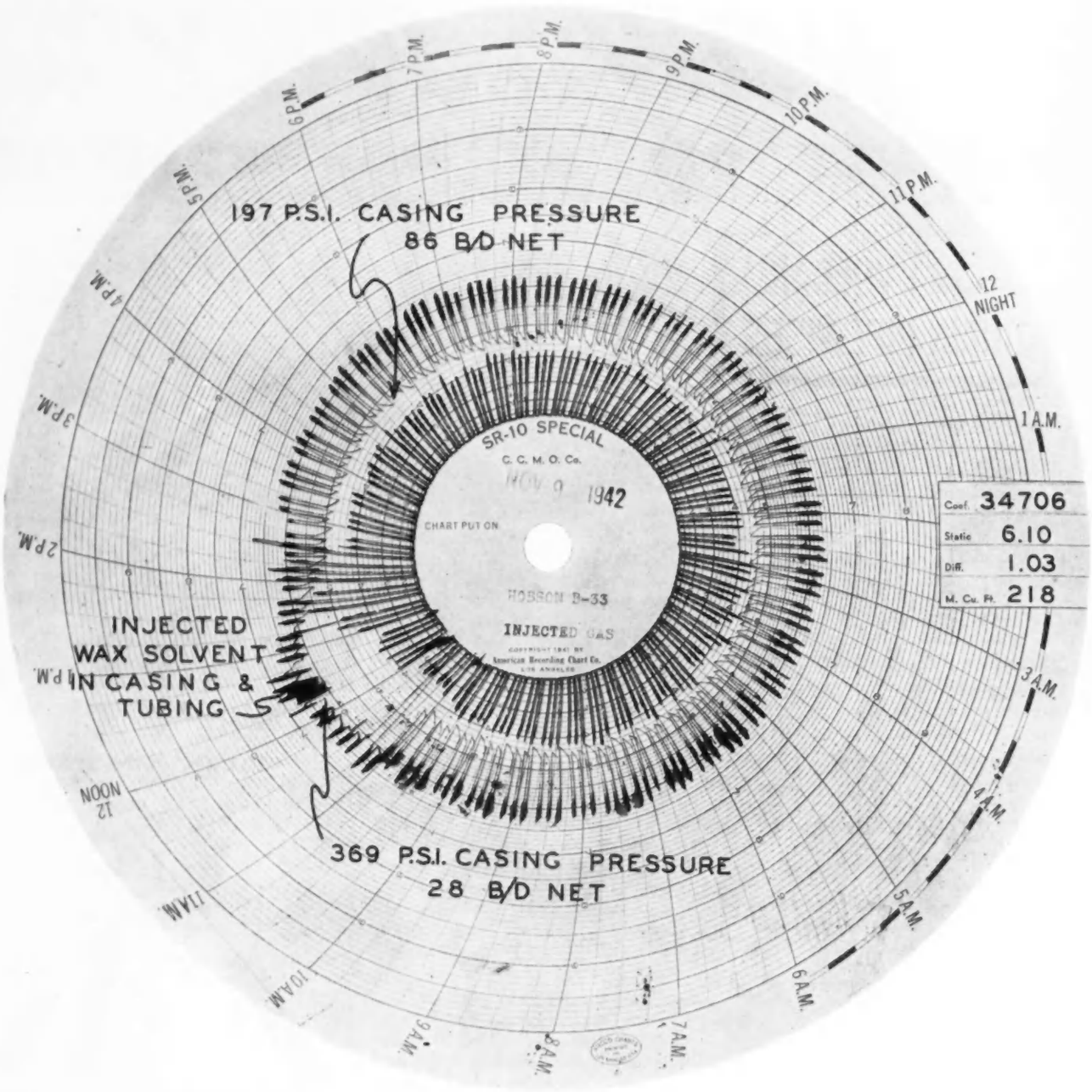


FIGURE 6
Typical gas-injection meter chart, showing effects of the chemical wax treatment

static and differential readings are computed and listed as shown.

The entire system can be changed in one operation by first setting compressor-plant output at the desired volume, and then by setting each well timer to conform to the worksheet. When the intermitter snaps on, the differential rate is set to conform to the worksheet by closing or opening the choking valve downstream from the orifice meter run. The response is instantaneous.

The procedure outlined above for making field settings is used at any future time for increasing or decreasing line pressure as operating conditions dictate. The line pressure desired is translated into a static reading, and all differential rates are recomputed to give the same gas volume. On a worksheet, these data eliminate field guesswork and juggling from well to well.

Timing is set accurately by use of a stop watch, and any point of beginning in the cycle may be used. From Figure 5, opposite "Time Scale," 0 is found under 13-17, although it might have been placed under any other pair. This is where the watch is started as the timer clicks on for a 3-minute period. If we arrive next at 31, the timer is set to come on at a stop watch reading of 25, and in similar fashion all timers are integrated. Once a time scheme is established, it will continue indefinitely; there is no out-of-step performance. Two advantages derive from this fact: First, such regularity establishes a uniform pattern on the recording pressure gauge connected to the 5-inch line at the compressor plant, any variation therefrom indicating trouble. Second, there are no pressure peaks in excess of cylinder capacity, and the practice of stacking discharge gas to compressor intake is eliminated, thus making full use of the energy contained in each cubic foot of compressed gas.

Accurate measurement of injected gas at individual wells presents many problems: Variations from normal laws oc-

cur at high temperatures and pressures. During cold weather, condensates may collect in either the high or low side of the meter. Sudden large gas injection periods are liable to blow the mercury, and it is necessary to retard the flow of mercury from one side to the other by choking, which makes the meter sluggish. These theoretical drawbacks, however, are outweighed by the invaluable well and system control that is possible only through use of orifice meters.

For example, Figure 6 is a typical gas-injection chart. Inasmuch as the orifice fitting is located downstream from the intermitting valve, the static pen becomes a recording pressure gauge for two important pressures. When the valve opens, the static pen rises to line pressure; when the valve closes, the pen falls to casing pressure and registers the casing pressure drawdown between injection periods.

If a well is not receiving enough gas to handle the fluid input, that fact will immediately be apparent from the casing pressure curve which will build up during each injection, in stair-step fashion.

If inspection over a period of days shows that the casing-pressure line has been gradually rising, increasing back pressure is to be suspected. This is usually found to be a wax deposit in either the tubing or lead line. Such a restriction is just as effective in increasing bottom-hole pressure, and back pressure against the sand face, as would be a bean placed in the tree, and has the same inhibiting effect on oil input. Unless the wax is removed, casing pressure will rise to line pressure and gas will cease to flow into the well.

In most cases, wax is easily and economically removed by a mechanical scraper run in the tubing with an immediate follow up by steaming the lead line from tree to trap. In other instances chemical treatment has been found effective. Its success, however, seems to depend upon the type of wax involved, for identical treatment has failed on some wells. Results seem to be proportional to the amount of asphalt and heavy-oil residues in the mixture. A high percentage of wax is hard to cut.

Figure 6 shows some good results obtained from chemical treatment. On this gas-injection chart may be seen a casing-pressure line that corresponds to 369 pounds per square inch. At this circulating pressure, production was 28 barrels per day net. Then a mixture of 9 gallons of distillate and 1 gallon of wax solvent was injected down the tubing by closing in the tree to stabilize the fluid column, and by using the differential pressure existing between the intermitter assembly and the tubing head to displace the mixture from the lubricator seen at the right in Figure 6.

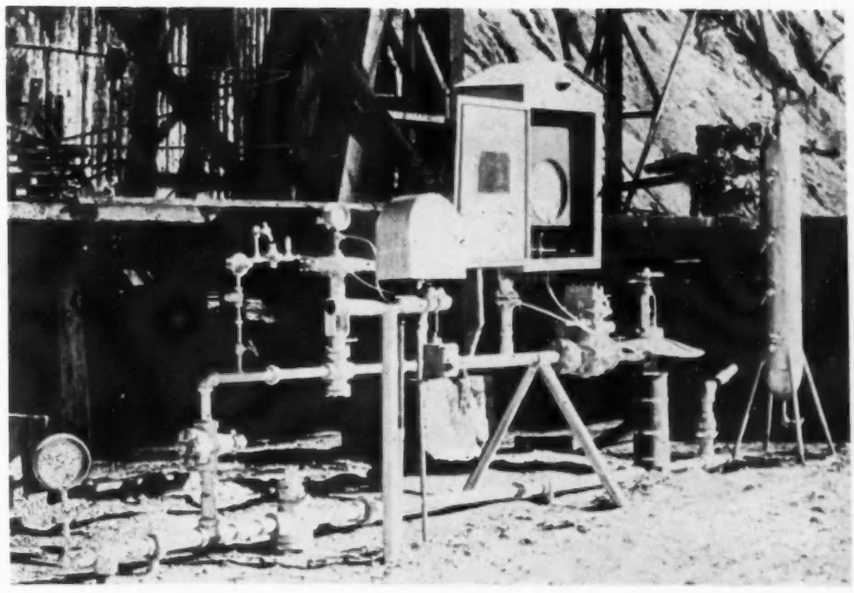


FIGURE 7
Individual-well meter-intermitter assembly

Tubing wax forms usually within 500 feet of the surface, making it necessary to close in the well for only a few minutes. Opening the tree then returns the dose to the surface.

A reduction in circulating pressure in this case was immediate. The drop was to 197 pounds which amounted to a removal of 172 pounds of back pressure. The flush production therefrom started with 86 barrels per day net, or an increase of 58 barrels.

The lubricator also may be used for continuous small-stream injection into the input gas. Differential pressure in this case is obtained from the pressure difference that exists across the valve during "on time."

Another problem encountered is that of freezing during cold weather. Ice and possibly hydrates form downstream from the intermitter assembly valve used for choking. This difficulty can be overcome by supplying electric strip heaters to the pipe below the valve, wrapping them in asbestos, and shielding from the rain. We have found it necessary to make one heater.

The general procedure followed in adding a well to the gas-lift system is to clean the well to bottom by bailing or circulating with oil, run the bottom-hole assembly and set the packer above the liner. This traps an equal height of fluid both in the tubing and in the annular space above the packer.

All the fluid in the macaroni and above the packer must be displaced into the tubing by gas pressure, before gas will break around the macaroni valve, and the pressure necessary to do this is the depth in feet of the macaroni valve times the weight per foot of the fluid involved, whenever the initial fluid level is high enough to insure oil reaching the surface before gas enters the tubing.

If the well is thus kicked on with gas pressure, it will be necessary to use a surface choke to protect the trap during the initial casing blow down. Or the fluid load may be continuously relieved with a swab until all the trapped fluid in the annular space is exhausted and gas breaks in at a much lower pressure. The course followed generally depends upon the rated pressures of tree fittings and the pressure involved; choice being primarily one of safety.

It becomes highly desirable, once the trapped fluid has been displaced and the well placed on production, that a reverse flow shall not occur. If fluid runs back up the macaroni and into the annular space during down-time, the well must again be kicked over, which means labor expenditure. By preventing this through use of the macaroni valve shown in Figures 3 and 4, the only kick-over pressure necessary is that which is required to lift the fluid that has accumulated in the tubing. In nearly every case the normal circulating line pressure is sufficient and the well kicks on automatically.

For example, during early experimental work, one well had a spring-loaded macaroni valve that soon fatigued and allowed fluid to run into the annular space. It then required 775 pounds pressure plus a swab to place the well on production where normal kick off pressure had been 350 pounds. Replacing the subsurface equipment with the check valve described herein eliminated the trouble.

Today's Interesting Tools

The Dynamometer

This instrument is the oil well stethoscope, through which working conditions of the pumping well are diagnosed so proper corrective measures may be applied in order to get best service from equipment

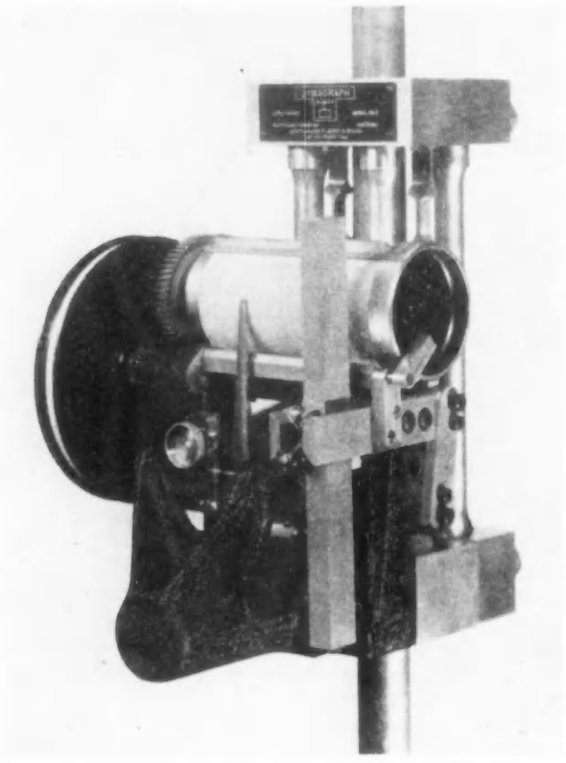
By FRANK BRIGGS, Staff Writer

OIL wells, like people, grow less active, more cranky and must consult the doctor oftener as they grow older. And like the medical profession, great advances have been made in recent years in oil-well doctoring, especially in diagnosing difficulties. The doctor has his X-ray, fluoroscope, stethoscope and other instruments that are of invaluable assistance, and the oil industry has its modern instruments also.

"Old Bess," the oil well drilled under the dignified name of Zesemoth 1, is typical of many pumping oil wells. She has produced several hundred times her weight in oil during her lifetime, and she is not dead yet. Just sort of cranky and creaky. She jerks and sputters with her old wooden rig-front face, but somehow always has managed, largely through the saving grace of her faithful attendant, the pumper, to fill her allotted volume in the tanks before the monthly visit of the pipe-line switcher. But Old Bess is pretty costly now; the water-cut has increased and the loads are pretty heavy. The rods fail frequently. Bess needs an examination, a pumping-well study. This can be accomplished by use of an interesting modern instrument.

In making a pumping-well study, the polished-rod dynamometer, is the stethescope of the oil-well doctor. This is no mere figure of speech, this instrument actually determines the workings of the heart of the well—the pump. It is also the scales to show that increased weight may be responsible for much of the trouble, and that the pace must be reduced and regulated.

The polished-rod dynamometer indicates the approach and cause of trouble; from the use of this instrument, the operating load at the polished rod may be found, the indicated horsepower at this point determined, and should these be excessive, mechanical failures may be expected. The "pound" can be felt, the dynamometer tells you where in the stroke it occurs and at what speeds it may be eliminated. The rod drag on the tubing, or the tight plunger, causing high frictional loads show nothing at the surface; the dynamometer indicates such conditions. Let the dynamometer show the difference in loads certain speeds may cause; vibration, the gremlins on the pumping well, greatly effect good or poor operation. Or that fancy, high-priced gadget that you have on the beam, let the dynamometer tell you whether or not it has any good influence on operation.



The mechanical dynamometer is an accurate, finely machined instrument. It magnifies the stretch in the polished rod, due to loading, approximately 400 times.

Dynamometer

There are three principal types of polished-rod dynamometers: those of a strictly mechanical nature that indicate the load by measuring stretch (over a short length) of the polished rod; the hydraulic type that compresses a liquid proportionate to the applied load; and the electrical strain-gauge type that, by suitable, intricate devises, measures a self generated current that flows in amounts proportionate to the load on the polished rod.

Looking somewhat like one of the more expensive sausage grinders, the mechanical dynamometer in use today is a very sensitive recorder, finely machined and in the course of operation magnifies the polished rod stretch between its measuring points about four hundred times. In placing the instrument in operation, care should be exercised in selecting a smooth, unworn portion of the polished rod for attaching. The strain gauge portion, consisting of four finely machined columns set in between two square-end blocks, is divided into two parts; one part contains the recording drum and its assembly. The two parts are bolted around the polished rod; hard faced points, or knife edges, bite into the rod to securely attach the instrument to the selected portion. A spring-return reel, gear connected to the recording drum, obtains the motion of the pumping beam by means of an attached cord. This arrangement gives the dynamometer-card curve its horizontal motion while the load moves the recording stylus in the vertical direction. No load must be upon the polished rod at the time of attaching the instrument.

The hydraulic dynamometer, consist-

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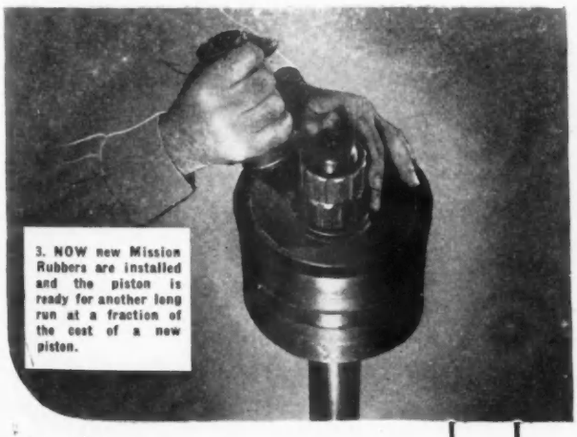

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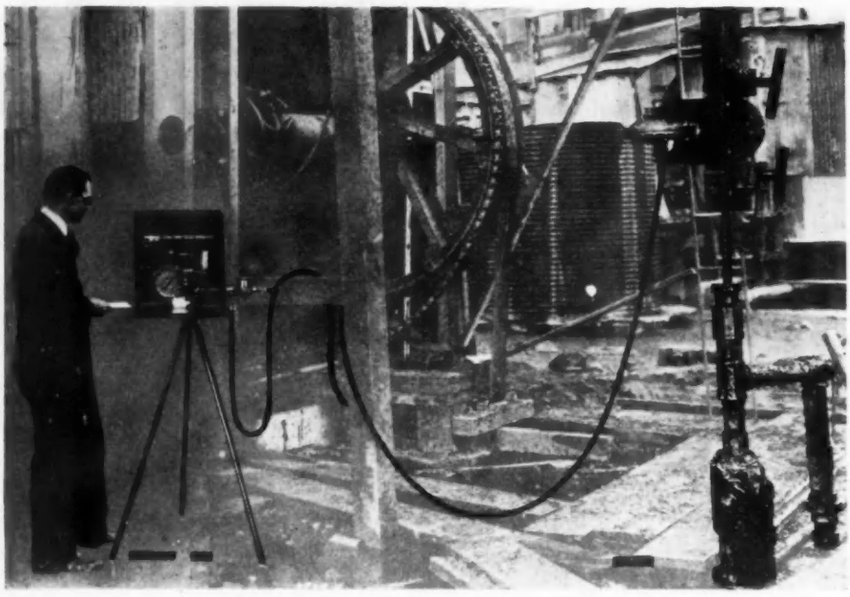

The hydraulic dynamometer is rugged and sufficiently accurate to make precision well studies.

ing of a recording mechanism that lacks only the black sheet to give it the appearance of a three-legged picture box and a strain-gauge assembly that looks like a lobster claw clutching a pie, is very rugged. The "pie" is a diaphragm that impresses the polished-rod load against fluid which transmits these impulses to the recorder by means of a specially constructed hose. The rod load is supported on heavy bronze castings (the claws) that operate upon hardened steel bearings like a beam scale and transmit one third of the load to the diaphragm unit.

As the engnneer begins to unload the various items composing the electrical dynamometer from the trunk, it begins to look like equipment for a performance of a magician. Then after setting up, and he lets you look into the viewing hood at the chart being traced, you think perhaps this is a miniature movie of the dancing-ball. However, everything finds a use with enough parts to go around and the finished well study made with this instrument is complete and accurate.

The electrical dynamometer consists of three distinct parts: the recording system, the generator and battery, and the strain gauge. Briefly, this is the principle: A direct current from an ordinary battery is transformed into alternating current through the medium of a small generator; flowing through voltmeters, ammeters, rectifiers, resistances, and other electrical parlance, the current reaches the strain gauge on the polished rod. The amount of current flowing depends upon the amount of load upon this gauge; it is recorded by a device known as the "oscillograph." The oscillograph is composed of a mirror suspended on a fine wire between the points of a magnet. The current flowing causes the magnetic field to vary, thus rotating the mirror—a rotation that is indicated by the reflection of a point source of light upon a photographic plate. The magnet assembly moves with the motion of the pumping beam, the mirror moves in a direction at right angles to this motion, thus making the dynamometer card curve.

Interpretation of Results

The pay-off lies in the interpretation of the dynamometer card and the remedies for the detrimental conditions found thereon.

The dynamometer card represents the load on the polished rod at all positions of the pumping stroke; more involved, it is a curve of the load displacement vs. time. Regardless of definition, and also of the many constituents such as friction, rod and fluid weight, vibrations, etc., the shape of the curves for any freely pumping well will be similar for similar conditions of operation or for operation that involves the same "harmonic" vibration. Getting untwisted, wells that pump with the same length of stroke, speed and from the same depth (if free from fluid pounds, rod

The electrical dynamometer provides accuracy with safety—for the operator does not have to stand under or near the rod hanger or walking beam.

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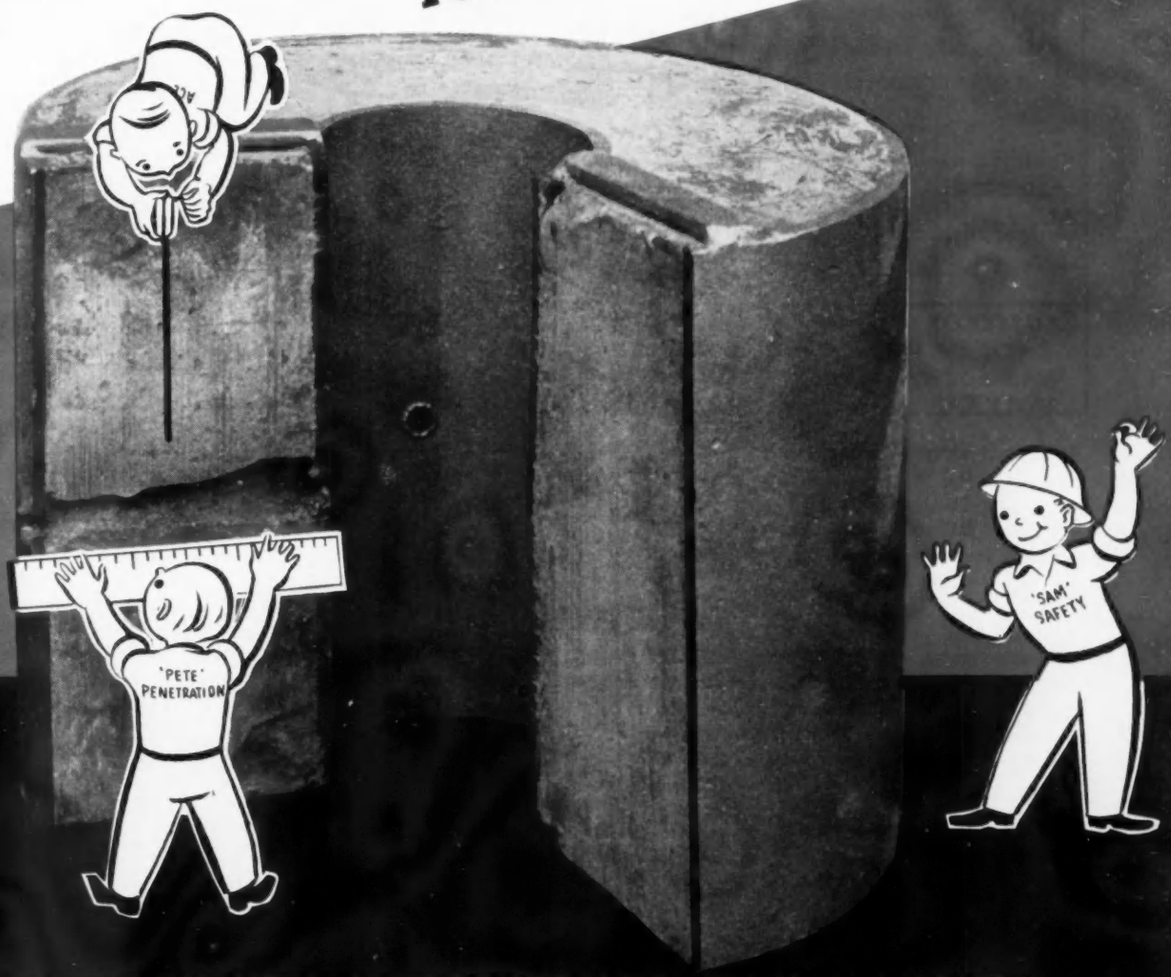

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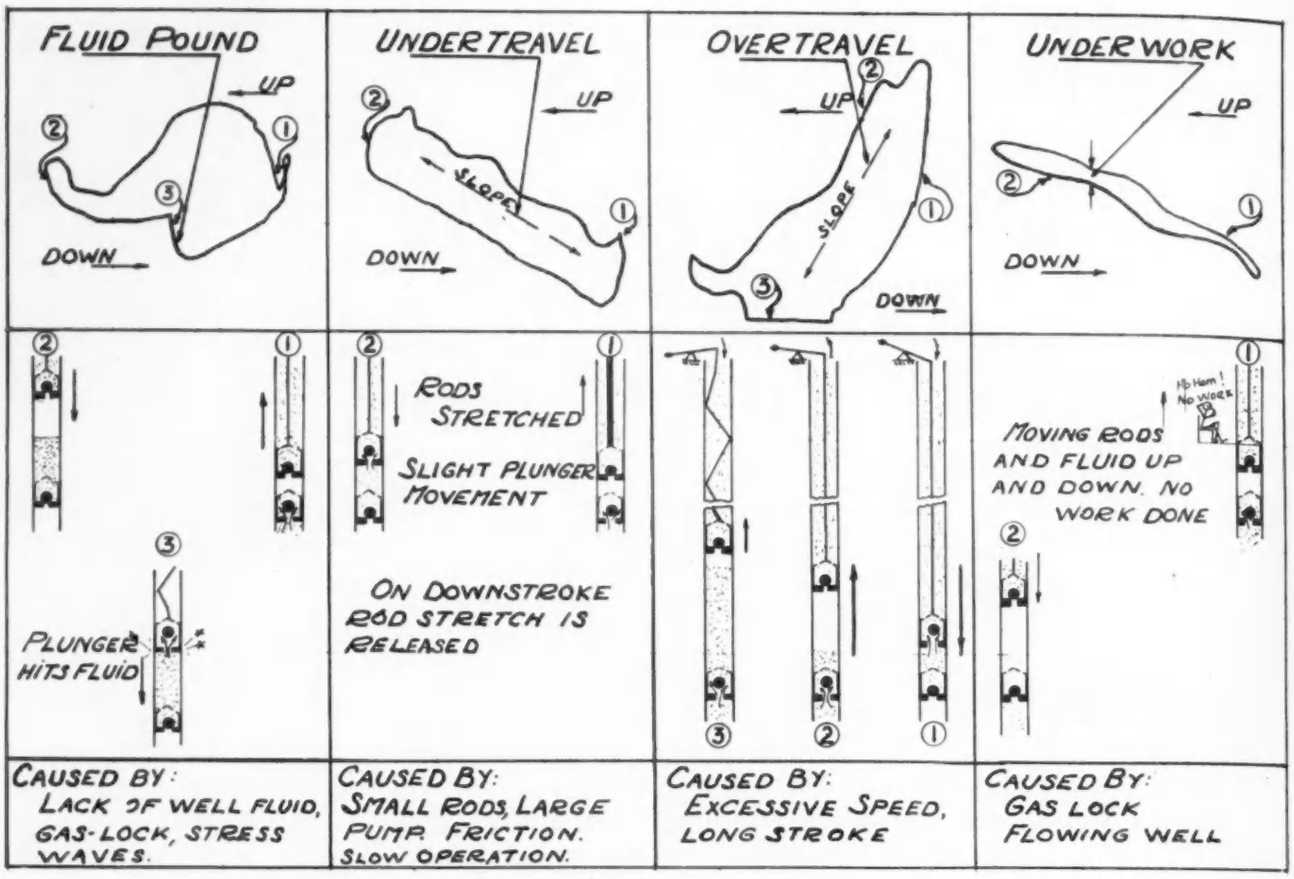

Typical trouble cards. The chart shows the polished-rod-load curve above, the probable subsurface pump performance at the indicated positions of the curve illustrated by the diagrams in the middle, and below are listed the possible causes of the detrimental condition.

The fluid pound is obvious; the plunger hitting the fluid level in a partially filled working barrel causes the sucker rods to bend, the load to drop suddenly. The condition of plunger undertravel, indicated by the slope up in the direction of the upward stroke and also verified by low volumetric efficiency, results in serious rod stretch only in the case of friction or inadequate size rods. An over-travel card slopes in the opposite direction; the plunger and polished rod (indicated by the arrow and small pumping beam at the top) travel in opposite directions for part of the pumping stroke. A full bodied card indicates large expanse of work being done during the pumping operation; a thin card, shown, indicates but slight amount of work being done.

drag, etc.) show load curves of the same shape. As the "harmonic" depends upon speed and depth of operation, wells having these factors in such degrees as to produce the same harmonic should haye the same shape load curve.

"Harmonic," musically, it refers to tones in tune, in harmony. Webster refers to it as "an overtone produced by a vibration frequency which is an integral multiple of that frequency producing the fundamental note." Vibrations in the rod string are in harmony, in phase when they travel up and down the string such that their frequencies are exact multiples of the natural or basic vibration of the rods themselves. The harmonics are classed into first, second, third, etc., orders and, depending upon the speed and depth of operation of the pump, all dynamometer-load curves should be either "synchronous" or "non-synchronous" curves of one of these orders. If synchronous, the vibrations in the rod string at that operation are exact multiples of the natural vibration frequency; if non-synchronous, the vibrations are out of step by a fraction of a frequency. Thus you may have characteristic load curves for all operations, thanks to inherent vibrations in the pumping system.

In a well with a fluid pound, the load curve shows sudden reductions on the down stroke. This is what should be expected; the pump plunger, striking the fluid level in the partially filled working barrel, momentarily receives an upward push thus relieving some of the load for an instant. Such a condition changes the usual shape of the trouble-free load curve; additional vibrations are introduced that are responsible. Sucker rods operating in this type of well are subject to severe damage if the loads are great and usually give poor service. Slowing the well down, shortening the length of stroke, introducing a smaller pump are remedies that relieve a pound due to a pump-off condition. A pound due to a gas condition is another problem and only experimentation with various speeds and strokes, as well as subsurface equipment, will determine the best operation.

Excessive loads due to the friction between rods and cork-screwed tubing or between a tight-fitting plunger and the working barrel are indicated by a continual increase in the load curve for the complete up stroke; the general shape of the curve slopes up in the direction of the upstroke. Only facts or experiments will determine which of the fractional conditions is responsible; pull the pump and examine it for wear. If pump changes have no effect, take a strain on the tubing—raise it one or two feet and try again. If the hole is crooked, there is not much that can be done about it other than to try rod guides.

Not all plunger under-travel can be attributed to excessive friction between rubbing parts; under-travel also results from the rods being too small for the size of pump in use. Try putting a heavy object, such as a pocket watch, on the end of a lengthy rubber band and just move your wrist up and down an inch or so. The watch will not move; all your pumping motion is lost in stretch of the rubber band. The same applies in the case of a pumping well; if the plunger size is too great, it will move but slightly and the surface pumping motion will be taken up by rod stretch.

Plunger over-travel also is due to ex-

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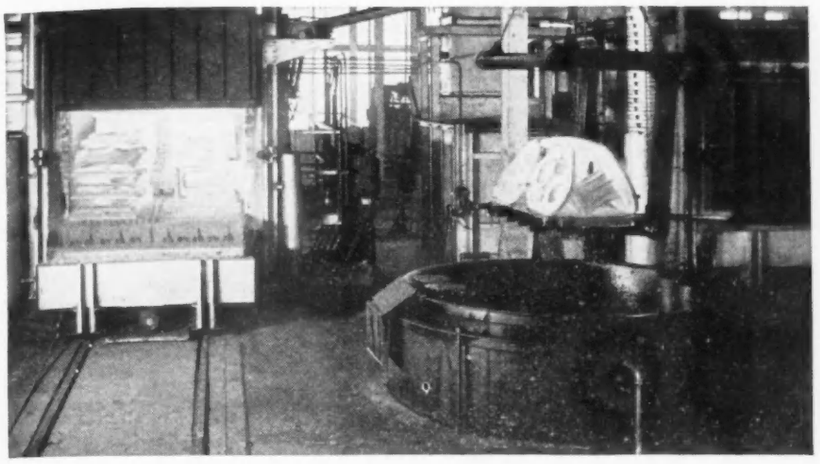

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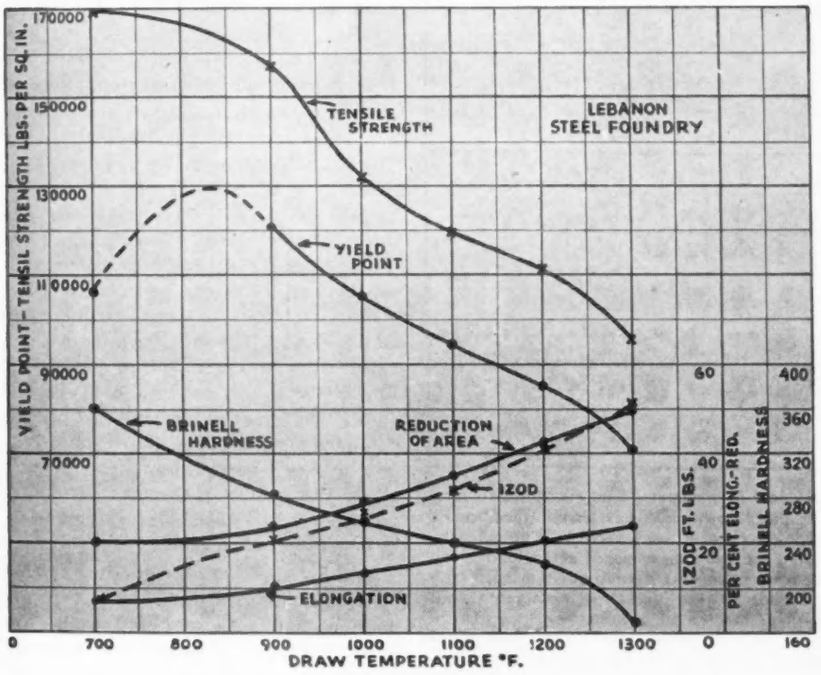

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Ⓛ-A	QQ-S-681b Class 3	49-S-1 Class A	1040	A-27-39 Grade H-1	0.40	0.40	0.70	80,000	40,000	17	25	170
HIGH TENSILE—Special Heat Treatment—(Liquid Quench and Draw)												
Ⓛ-C*					0.40	0.40	0.70	100,000	75,000	15	30	200
Ⓛ-D*					0.40	0.40	0.70	125,000	85,000	10	20	250

*Restricted to 1½" sect. max.

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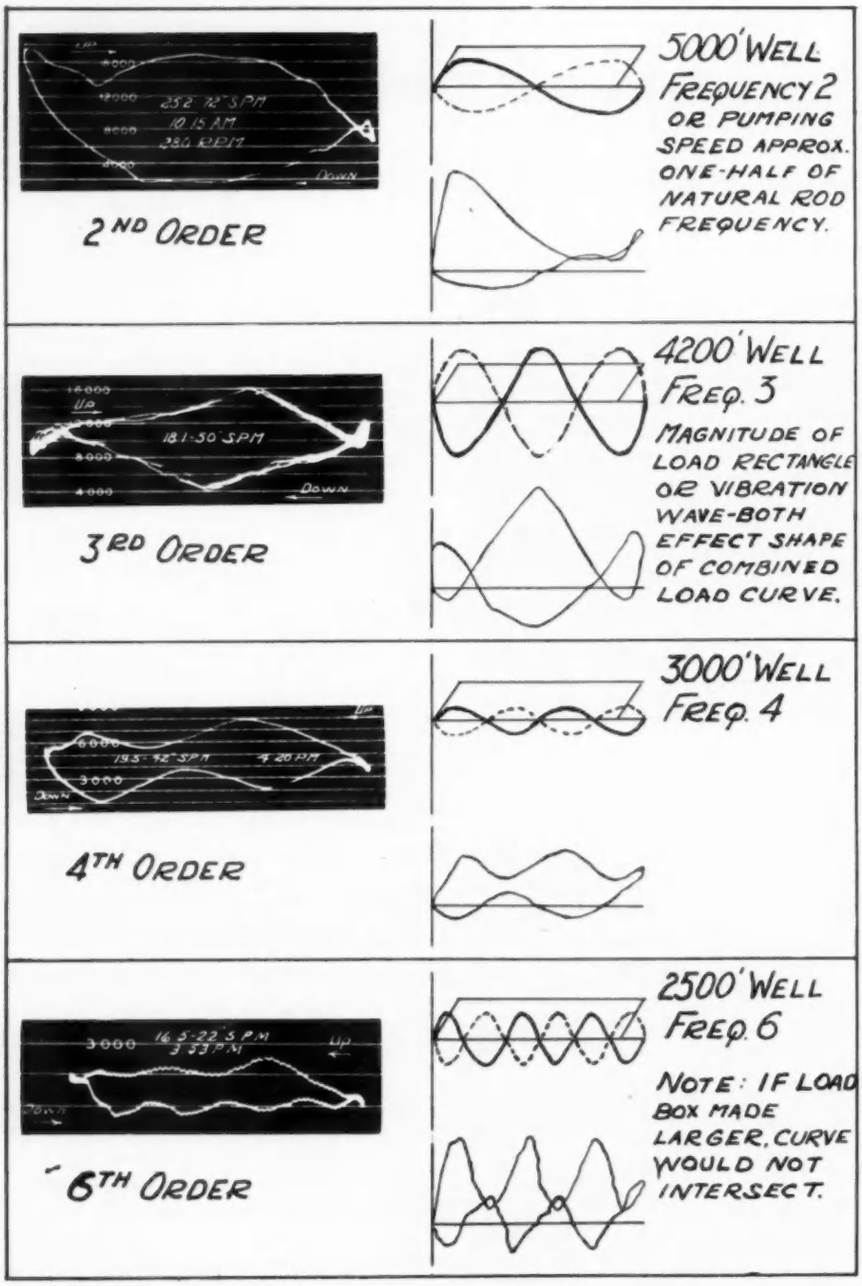

Typical dynamometer load curves for trouble-free pumping wells. The derived load curve, the lower curve in each section, is obtained by adding the two superimposed curves at the top of each section. The derived curve in each case is similar to the actual dynamometer card shown at the left of each section.

The sine curve represents the longitudinal wave resulting from the sudden (pumping) force applied to the fixed end of the rod string. At the pump end of the rod string the wave is reflected and returns. If a dynamometer card was obtained on the 5000-foot well in the top case with only the rods (no pump attached) operating up and down, it would have an appearance similar to the sine curve shown. No work is done; the net area of the cord is zero. Now the rectangle also shown on this same axis represents the force, minus all acceleration forces, necessary to lift the fluid column; by adding these two, the actual load and the actual vibration curves, the realistic polished rod load curve is derived. The magnitude has been neglected; it is the shape that has been the prime consideration in this derivation.

cessive rod stretch but in this case, the pumping motion is so great that the plunger is literally thrown away and pulled back again by the elastic properties of the rod string. On dynamometer cards indicating over travel, it is characteristic that the maximum load occurs at the extreme end of the down stroke while the load is in constant reduction on the upstroke. This is exactly opposite to the load characteristics of normal cards and indicates that the plunger is traveling (part of the time) in opposite directions to that of the polished rod.

As previously stated, vibrations caused by the pumping motion are important in that for freely pumping wells they determine the shape of the load curve. They are also important in determining the maximum load. For instance, the maximum load at one speed may be less than at a speed slightly greater or less—depending upon whether or not that speed makes the vibrations in phase (synchronous) or out of phase (non-synchronous). The vibrations in phase increase each other, thus increasing the load; those out of phase cancel much of the combined vibration thus reducing the load.

In case it is suspected the cups on the plunger of leaking, put the dynamometer on the polished rod, pump the well for a few minutes to make sure the tubing is full, then stop on the upstroke (to put the weight of the fluid column on the plunger) then notice if there is any reduction in the dead weight over a period of time. If so, this loss of weight can only be accounted for by fluid slipping past the plunger, indicating worn cups or leaky valves.

Perhaps you doubt that the load-reducing mechanism on the beam is helping. Put the dynamometer on the well and make tests, at similar speeds and under the same operating conditions, with and without the equipment in question on the well. If similar cards show load reductions with the equipment in use, you have benefitted the operation. Then just to make sure, set up service records and find out how your failures are reduced or eliminated.

Now about counterbalancing with the dynamometer. Do not be too positive that it can be done in 100 percent of the cases — or 50 percent. Every pumper knows that a well may appear to be in good counterbalance for a certain speed of operation, and be out of balance for another. So select the desirable speed of operation, counterbalance first by manufacturer's specifications, then by eye, and check the result with the dynamometer. For wells operating with a speed and depth that gives a card in the third order harmonic, the peak on the upstroke of the load curve should be directly above the valley on the downstroke for good counterbalance. This applies to rotary counterbalance only.

The polished rod dynamometer is one of today's interesting tools to the production man with pumping wells. The brief survey presented herein does not exhaust its possibilities as an instrument in the determination of pumping conditions; rather it is only a peep into the most commonly found well conditions and their determination. If the practical man understands these, he realizes that the engineer is doing more than wasting time by putting that "do-dad" on the polished rod. He can actually reduce down-time, maintain production and help the pumper stay abed on the cold nights.

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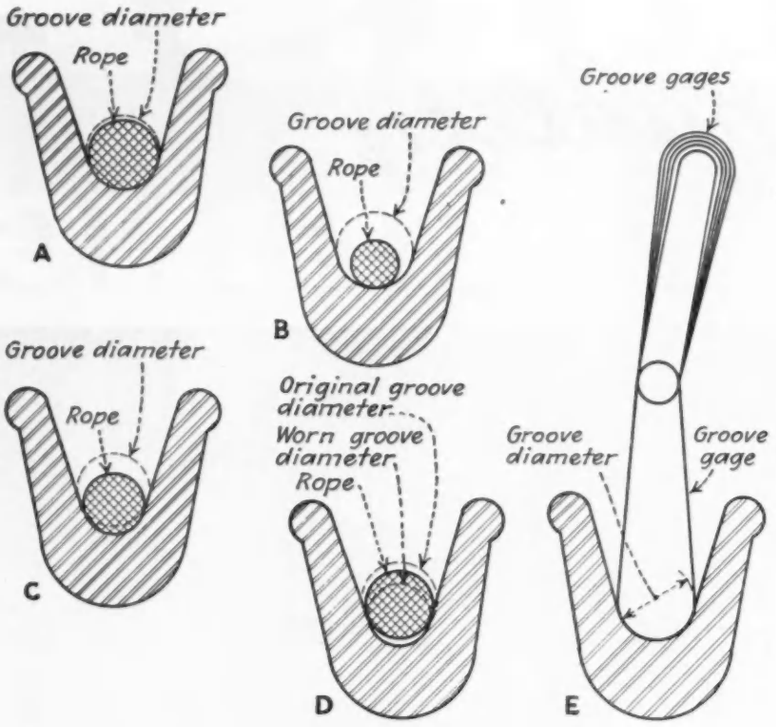


FIGURE 1

Grooves should support a wire rope for nearly half its circumference, as in A. When a groove is too large, B, the rope tends to flatten under tension. C, this groove has worn to the decreased diameter of the rope. D, a new rope in a worn groove will be inadequately supported. Use a groove gauge, E, to check grooves.

Second of a series of articles on saving wire rope. First article, published June 7, was "How to Inspect Wire Rope."

By A. J. MORGAN,
Chief Engineer,
Wire Rope and Strand Division,
John A. Roebling's Sons Company

How to Inspect Sheaves Used With Wire Rope

PROPER inspection of wire rope must necessarily include examination of the equipment on which it is being used. In the majority of instances the cause of abnormal deterioration of wire rope is to be found in the machinery on which it is operating.

The principal items to be checked are:

1. Sheaves
2. Drums
3. Reeving
4. General operating conditions

Sheaves

Points to be checked on sheaves are:

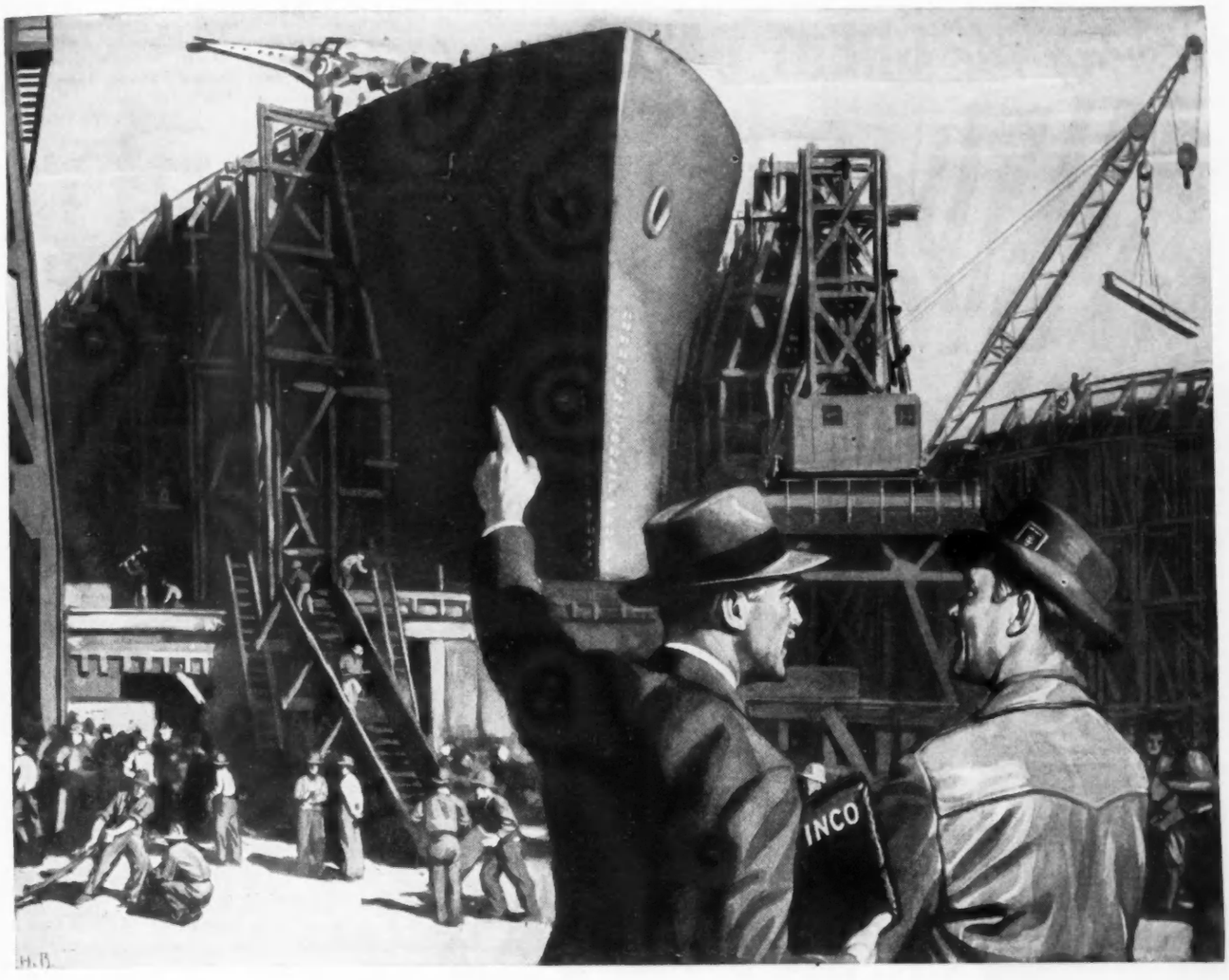
1. *Size.* Measure the diameter of a sheave from bearing surface to bearing surface, not from flange edge to flange edge, because it is the radius of the bearing surface which governs the degree of bending to which the rope is subjected as it travels over the sheave. Table 1 gives the recommended and the minimum sheave diameters for various constructions of rope. (These recommendations apply to drums as well as sheaves.)

Since the rate of fatigue of wire rope is governed very largely by the radii of the bends which it must take in normal operation, it is extremely important that the recommended diameters be equalled or exceeded. A large amount of internal wear is caused by improper sheave (and drum) diameters, since the radial pressure on a wire rope increases in inverse proportion to the radius of the bend. As the radial pressure increases a crushing action takes place in the rope, which increases internal friction and causes nicking of one inside wire by another.

TABLE 1
Recommended and Minimum Diameters for Sheaves

ROPE	Recommended Diameter No. Times Rope Diameter	Minimum Diameter No. Times Rope Diameter
6 x 7	72	42
6 x 19	45	30
6 x 30	45	30
6 x 37	27	18
8 x 19	31	21
18 x 7	51	34

2. *Sheave Grooves.* The diameter of the bearing grooves of sheaves (and drums) must bear a certain definite relation to the diameter of the wire rope used in it. See Figure 1. As a rope passes constantly over the sheave, the groove is worn deeper and its diameter becomes steadily smaller until it is less than that of a new rope of listed diameter. When a new rope is placed in such a groove it will be forced down into the groove and be pinched out of shape. Hence, it will be subjected to extreme conditions of abrasion against the sides of the groove. Also, it will be forced out-of-



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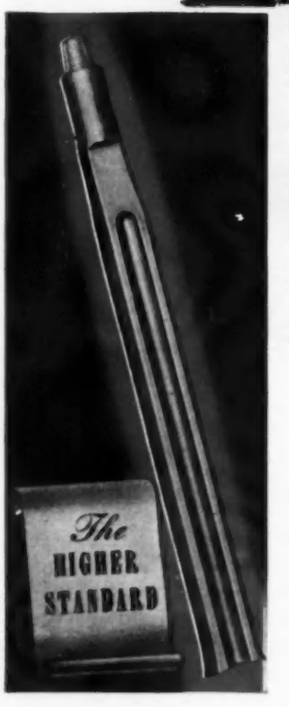

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TABLE 2
Tolerance by Which Sheave Groove Diameter Should Exceed Rope Diameter

Nominal Rope Diameter, Inches	Recommended Tolerance, Inches
¼–⅜	1/16
⅜–¾	1/8
¾–1¼	3/16
1⅜–1½	1/4
1⅝–2¼	5/16
2⅜ and larger	3/8

round and therefore will become unbalanced.

On the other hand, a rope placed in a sheave groove of too great diameter will not be afforded proper support. Such a condition tends to allow the rope to flatten out as radial pressure is applied to it.

The ideal condition is that in which the wire rope receives support from the sheave groove around just less than one-half of its circumference. The rope is thus allowed freedom of action with a maximum of support. Gages for measuring sheave grooves can be obtained from any wire rope manufacturer.

Table 2 gives the tolerances recommended for sheave grooves.

3. *Sheave Materials.* Sheaves of too-soft material will be cut by wire rope, and their bearing surfaces will become corrugated to fit the contour of the rope used over them. This contour will not exactly conform to that of the next rope to be used over them; therefore the new rope will be cut and worn by the corrugations. Where such a condition prevails the sheaves should be re-machined or, preferably, replaced with sheaves of harder material.

Such corrugation will occur more readily if the sheave diameter be too small.

4. *Sheave Operation.* Defective bearings will cause sheaves to wobble or to revolve eccentrically and will thus set up a whipping action in the wire rope. Whipping will, of course, greatly increase the rate of fatigue and other deterioration of the rope. Such a condition should be corrected immediately.

5. *General Sheave Conditions.* A sheave that is out-of-round or has a flat spot on its bearing surface will also cause whipping of the rope and must be repaired immediately. Sheave grooves should be either machined or ground to a smooth and true surface and contour.

When a sheave flange is broken off the wire rope may jump this flange and cause serious damage both to the rope itself and to the machinery. If the rope does not jump the flange, it is at least likely to come in contact with the sharp edges of the broken flange, which may gouge it badly. Such sheaves should be replaced without delay.

These two kinds of wire rope are made in our factory of the same special analysis high carbon steel, the same carefully controlled heat treatment and continuous wire drawing process. As made by our skilled craftsmen both give you plus value.

Yet there is a difference which means money-in-your-pocket. It is this: In ordinary wire rope of any make, the wires are "laid" into position without first being relieved of stresses set up through changing wires from straight to helical or spiraling shapes. Under these unresolved stresses, the wires have a strong tendency to fight each other and will fly apart when the seizing wire is removed. This wasted effort cuts down the resistance to bending fatigue of the rope as a whole.

In *Union-formed* wire rope, the method of helical or spiral shaping the wires in it before they become component parts, entirely frees the rope of shaping stresses. Thus preformed, parts lay in their positions in such perfect repose that they will not fly apart—in fact, often must be pried from position. *Union-formed* wire rope, therefore, utilizes its full stamina for maximum resistance to bending fatigue. That is why *Union-formed* wire rope bends more easily. Every wire and every strand pulls together to wear longer.

This is only one of 10 time-saving, money-in-your-pocket advantages of *Union-formed* wire rope. To the limit permitted under conditions of war, Union is striving to satisfy urgent needs outside of war production.

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IF YOU ARE NOT ON OUR MAILING LIST send for these bulletins: "ROPE DOPE," "Socketing Wire Rope," "Splicing Wire Rope," "Correct Handling of Wire Rope," and "Wire Rope Lubrication." Engineering information supplied without obligation. G-43

★ *Another 6 Months of Star Performance*

union *Wire Rope*
"THE ULTIMATE IN LOW COST WIRE ROPE"

WAR PRODUCTION EXCELLENCE WILL BRING POST WAR PLUS VALUES

WHEN YOU NEED PREFORMED WIRE ROPE
SPECIFY **union-formed**

PRACTICAL OPERATING *Hints* FOR THE PRODUCTION MAN

$5.00 will be paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, *Houston.*

1. ROD-LINE PUMPING

Alarm for Overrun Minimizes Damage

Snubber rod across frame prevents dropping of cart in break, while circuit closed by over-travel of wheels actuates gong and light to warn of rupture in line.

DURING these times it is an advantage to have the leases fixed up as nearly automatic as possible.

One lease is operated by a central power, pulling the wells through the type hook-up assemblies shown. Whenever the sucker rods parted, the friction in the rod line, with the possible exception of a very deep break, caused the well to unhook itself and then the weight of the rods would pull the cart out the end of the hook-off assembly onto the ground. The same thing would usually happen when the rod-line parted, as the well would unhook itself and then the weight of the rods between the stakes would pull the cart out as in the case of a sucker rod break.

A piece of rod was wired in place under the top rails to prevent the cart from coming out and it was noticed that in about 90 percent of the cases, the cart was pulled tight against the rod. Since this was the case, in order to signal the pumper in case of a rod job or rod-line break, a wire was run around to all of the hook-offs under the ground and was attached to the left rail of the hook off (lower rail) so that when the cart came back against the end, it would rest on it. When the cart was in motion as the well was pumping, it would not roll over it. This wire was uninsulated and was attached to the grounded side of a regular 110-volt AC current.

The ungrounded or hot side, was run to all of the hook-offs on 2 x 4 poles, bolted to the sides of the hook-offs and the wire run down to the lower right-hand rails and insulated from the rails themselves. The bare end of the wire was extended out over the rail, but kept up off of it so that when the cart unhooked and rolled up against the end, it would mash this hot wire down and close the circuit, blowing a siren located at a central place and audible all over the lease.

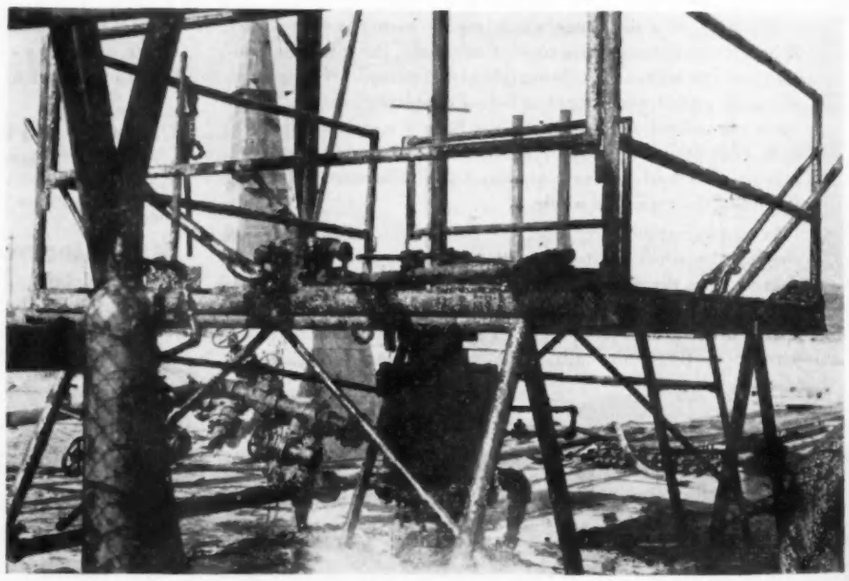
2. MAINTENANCE

Portable Platform Speeds Well Work

WHEN conditions and equipment exist at a producing well which prevent operations being performed in the usual manner one company has provided a portable platform which raises the men to a convenient working height above the casinghead and other surface controls.

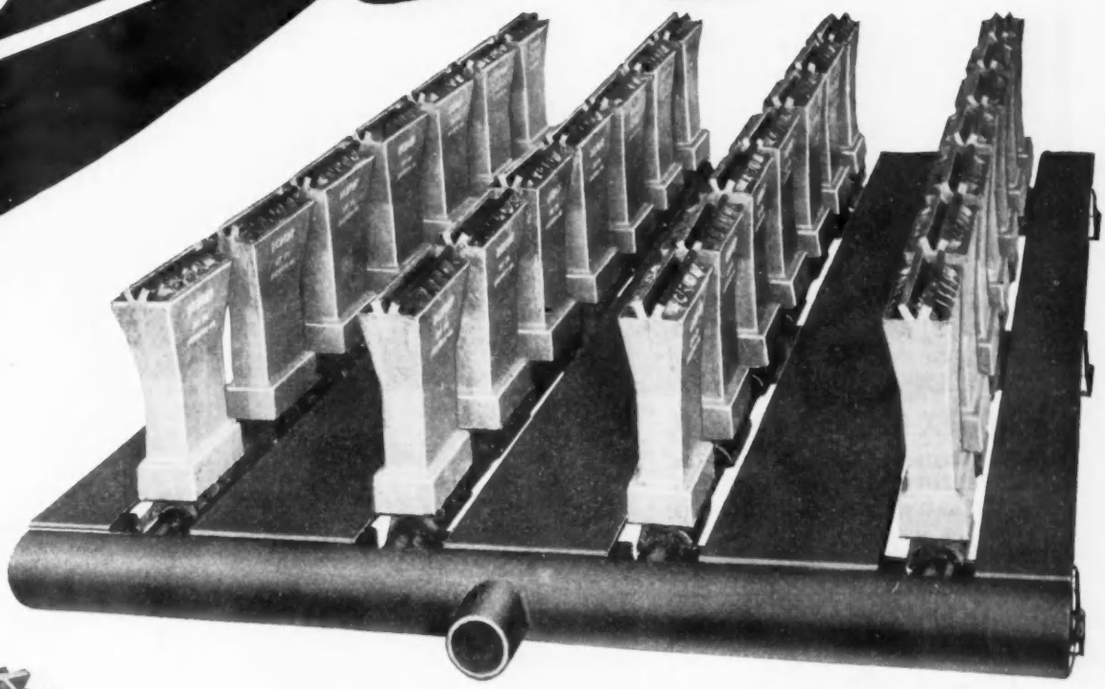
Two supporting devices similar to a carpenter's horse are made of 2-inch tubing cross-braced to afford the proper working strength, these being placed on each side of the well and resting on the concrete apron.

A platform of 2-inch pipe and angle iron to retain a wood floor is placed on the two supports forming a working area sufficient for two or three men to stand on while pulling rods, tubing or



Demountable and unitized stand with railing to prevent accidental misstep surrounds well and puts crew at height for most advantageous servicing of rods and tubing.

Hottest BURNER IN THE OIL FIELDS!



Patented V Mantle Spreads Blue Flame Over Entire Fire-Box

HUNT-REAGAN

Improved Low Pressure Gas Burner

Delivers more heat per dollar of fuel cost. Patented V-Shaped mantle spreads blue flame throughout entire fire-box. Produces maximum boiler horsepower, with less fuel, and without stack blowers. Installed in 30 minutes . . . cleaned in 5 minutes. Built in all standard boiler sizes. It's the oil country's No. 1 Steam-maker! Full details in your Composite Catalog, or Hunt Catalog.

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LAMTEX
Casing Pumps

NO TUBING;
CHEAPER OIL!

You save or salvage 30,000 to 40,000 lbs. of tubing and cut the cost of every barrel of oil produced when you install the LAMTEX Left-Hand Packer Assembly in a low fluid level well.

No dumping when you come out for repairs to the working barrel. Minimizes fluid and rod friction. Takes full advantage of the natural lift of the formation gas.

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2501 Virginia St., Ft. Worth, Tex.
REPRESENTATIVES: WINK, TEXAS; McPHERSON, KAN.; CASPER, WYO.

EVERYBODY EVERY PAYDAY AT LEAST 10%

WAR MEMO:

The aims behind the War Bond Payroll Savings Plan are worth repeating over and over:

1. To help pay the stupendous production costs of winning this war.

2. To siphon into production channels that portion of America's *current income* which would otherwise flood the Nation with inflationary cash.

3. To create individual backlogs of financial security for use during the industrial readjustment after the war.

4. To create a Nation-wide saving habit which will serve the interests of both Capital and Labor after the war.

Keep after that "10% of gross payroll goal"! Buy War Bonds to the limit yourself—encourage your employees to do likewise!

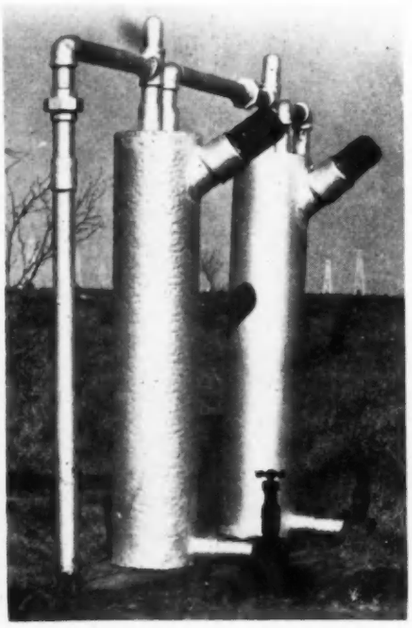
☆ ☆ ☆ ☆

running small pipe for reverse circulation.

Substantial rails of pipe are slipped over stubs welded to the frame of the platform to prevent falling from the raised structure while working on an oily surface.

3. *FUEL CLEANING*

Dual Scrubbers Cut Gas Contamination



Paired units insure ample gas cleaning, while large apertures simplify clean-out chore.

SIMPLE but effective gas scrubbers are made from sections of 10-inch pipe with top and bottom plates welded to the shell. The gas entrance and exit connections are both welded in at the top; a 4-inch clean-out connection is made at an angle near the top and a 2-inch drain welded into the shell near the bottom. By placing two of the units on the line in series, very satisfactory scrubbing action is obtained.

The unusually large clean-out connections simplify the task of removing clogging material from the units, either by flushing out or scraper operation through 4-inch aperture.

Aside from simplicity and effectiveness of operation, this type of scrubber has the added advantages of strength and inexpensiveness.

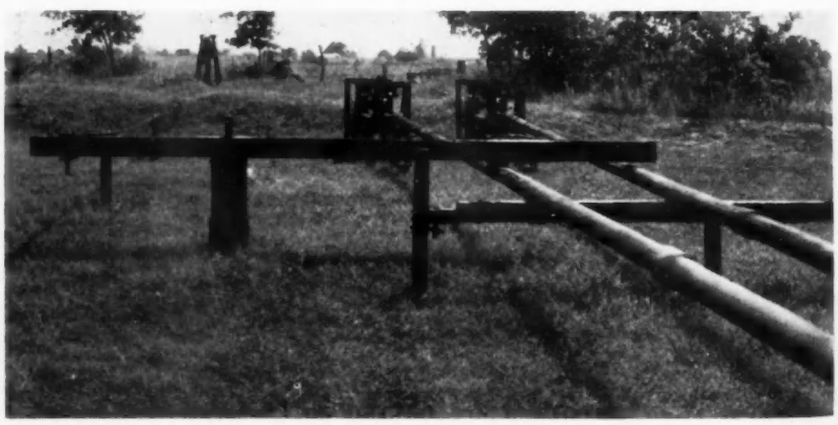
4. *WATER SUPPLY*

Rod-Line Rider Drives Shallow Unit

THE method of pumping a lease water well, as shown in the illustration, was worked out to save the cost of setting a knock-off, pitman, etc., necessary to pump the well from the central power. Also, a stroke post would have been required as the water well could not operate at the 30-inch stroke put out by the central power.

A ¾-inch bolt, about 4 inches long, was welded on top of the 2½-in pipe pitman running to the knock-off as shown. About five feet to the side of this bolt and just even with the center of the stroke, a piece of old casing was set in the ground and cemented, to act as a pivot. A steel plate and another bolt were welded on top of this pipe. A piece of 3- x 8-inch timber was then placed, a hole being bored so it would go over the bolt on the pivot pipe and a slot cut in the end so that the horizontal motion of the pitman set up by the eccentric could be accounted for without binding the timber.

The water well rod line was attached to the other end of the timber by means of a yoke. The stroke of the water well is determined by the distance from the pivot to the yoke.



Swivel post and slotted arm contacting pin set in well linkage motivates light jack on water well. Unit is operative even when oil well is hooked off, due to tie-in location.

☆ ☆ ☆ ☆ WASHINGTON ROUNDUP ☆ ☆ ☆ ☆

WITH the ban on pleasure driving threatening to spread into the Middle West, Congressional interest in the East Coast gasoline situation mounted during the week, although PAW Ickes, discussing conditions with an unofficial Senate-House committee, indicated that non-essential driving would not be outlawed or the value of coupons cut in the interior states before August 1, at least.

Meanwhile, the weekly PAW supply report showed that tank-car deliveries during the week ended June 5 averaged 898,744 barrels daily, an increase of 7847 barrels over the preceding week, with kerosine in drums moving at the rates of 9699 barrels, making a total rail movement of 908,443 barrels a day. Stocks, however, were at only 25.7 percent of normal.

Most important development of the week was Ickes' drive for full control of oil, including rationing, and his request to OPA for reconsideration of its refusal to increase crude prices.

It was indicated that Ickes was determined to fight for his views to a finish, with indications that the oil situation will give James F. Byrnes his first headache as director of the recently-created Office of War Mobilization.

Also in the news was a new drive to secure federal ownership of the western off-shore oil deposits, to be led by Senator Nye of North Dakota, now readying legislation which he said will involve a "new idea," the nature of which he declined to disclose.

Ickes Starts Showdown Fight for Exclusive Oil Control

»

Sharper Gasoline Restrictions Likely in Middle West

»

Another Major Shake-Up in OPA Is in Prospect

»

Gulf Coast Refinery Crude Runs Boosted 45,000 Barrels

»

By B. F. LINZ
Washington Correspondent

☆ ☆ ☆ ☆

Ickes Demands Authority Over All Oil Policies; That OPA Reconsider Price

A definite showdown on oil control is in the cards as a result of PAW Ickes' demand on WPB last week for the exclusive authority to make all oil policies, and an application to OPA Brown for re-consideration of his refusal to grant an increase in crude oil prices.

Ickes' fight for control came up at the WPB board meeting June 8, and was the subject of extensive and not entirely amicable discussion, later being taken "under consideration."

His application for reconsideration of the price question was sent to OPA June 10.

Represented as determined to force the two issues to a final showdown, Ickes was said to be planning to carry the fight to James F. Byrnes' Office of War Mobilization. Such action, he said, definitely would be taken if Brown refused to reopen the price question.

Ickes is understood to have demanded of WPB that PAW be given the power to ration, but would leave the mechanical handling of coupons to OPA. He has never been anxious to handle rationing, but now is represented as believing it the only logical course. WPB, as the directing agency, has the authority to switch rationing from OPA to PAW.

A precedent for Ickes' program was laid down when William M. Jeffers, as rubber director, succeeded in prying the whole rubber program loose from WPB control and centered it in his office. Ickes is attempting to do the same thing with oil.

OPA Shake-Up Due; Brown Reported Resigning

Another major shake-up of the Office of Price Administration was in sight this week as friends of Administrator Prentiss M. Brown, now at his home in Michigan, indicated that he would not return to Washington or at most would come back only to wind up his affairs.

Brown's resignation, it was rumored, was submitted to President Roosevelt on June 4, but there was no word at the White House to confirm the report or indicate whether, if tendered, would be accepted.

Brown has been spectacularly unsuccessful in curbing inflation, and before he left Washington admitted that prices have gotten out of hand. He has been under fire particularly for his failure to curb food costs and to meet the gasoline crisis in the North Atlantic States.

A definite move is under way in Congress to dismember OPA, transferring food prices to the War Food Administration and all oil control to PAW, which has wide support among the delegations from the agricultural sections and the East Coast, as well as from the industrial states from which complaints of the cost of living are coming.

Most of Brown's difficulties are attributed to the staff of "lawyers and college professors" which he inherited from his predecessor, Leon Henderson, and much of his time has been taken up by controversies within the organization. Many of the top officials whom he brought in have resigned, unable to agree with the policies followed by the Henderson group, and many of Henderson's appointees also have left.

Meanwhile, his efforts to roll back food prices and—much too late—get the Eastern gasoline situation under control have had little effect and have aroused much criticism in Congress, which originally was friendly to him as a former member of the Senate.

Off-Shore Oil Deposit Confiscation Again Proposed

Senator Gerald P. Nye of North Dakota, author of legislation under which the United States would assert title to the off-shore oil deposits which was the subject of lengthy hearings before Congressional committees three years ago, is perfecting another bill for introduction, embodying a "new idea."

Nye has declined to disclose what the "new idea" is, but it is possible that his proposal for government ownership will be based on the war emergency rather than upon the claim of title to lands between low-water mark and the three-mile limit which was the crux of the controversy over the original legislation.

It is believed that the measure will be aimed solely at government acquisition of the California off-shore deposits and will not include the Gulf Coast underwater oil fields.

Nye said his "new idea" had been given him, but Harold L. Ickes denied that he was the source and expressed the opinion that nobody in his organization would be likely to make any legislative recommendations without consulting him. He said that the matter of the off-shore deposits has been touched upon occasionally at staff meetings but there has never been any extended discussion and no policies have been formulated. In fact, he added, it was quite possible that some of the PAW officials would not agree with his views on the matter.

At a press conference on June 10, Ickes said California is in a "very tight" situation so far as crude is concerned, and Davis added that "they may well be apprehensive as to the future," not only with respect to gasoline but on fuel and other products.

Gulf Coast Refineries Ordered to Increase Crude Runs to Supply More Products for War

June quotas of crude oil runs of 14 Gulf Coast refineries were increased to 85 percent of their runs during the last 6 months of 1941, as compared with a 75.2 percent quota for May, under orders issued June 9 by PAW.

The net effect, it was said, will be to increase the District 3 refinery output by about 45,000 barrels daily. Refineries which were given no increase are war plants already operating at rates yielding a maximum of war products from a minimum of crude and at rates in excess of 85 percent of their 1941 runs.

Plants for which quotas were increased included The Atlantic Refining Company, Atreco (Port Arthur), given 21,792 barrels; Crown Central Petroleum Corporation, Houston, 11,388 barrels; Gulf Refining Company, Port Arthur, 127,417 barrels; Humble Oil & Refining Company, Baytown and Ingleside, 189,501 barrels; Magnolia Petroleum Company, Beaumont, 91,493 barrels; The Pure Oil Company, Nederland (Beaumont), 40,490 barrels; Republic Oil Refining Company, Texas City, 18,000 barrels; Sinclair Refining Company, Houston, 62,406 barrels; Southwestern Refining Company, Corpus Christi, 9834 barrels; Taylor Refining Company, Corpus Christi, 17,503 barrels, and The Texas Company, Port Arthur, Port Neches and Galena Park (Houston), 153,843 barrels.

Quotas for other war-product refineries were set as follows: Amsco Refining Company, Corpus Christi, 8108 barrels; Coastal Refineries, Point Isabel, 6360 barrels; Continental Oil Company, Lake Charles, 12,383 barrels; Maritime Oil Company, Houston, 5600 barrels; Pan American Refining Company, Texas City, 88,200 barrels, and Destrahan, 8500 barrels; Pontiac Refining Company, Corpus Christi, 20,798 barrels; Standard Oil Company of Louisiana, Baton Rouge, 123,944 barrels, and Shell Oil Company, Houston and Norco, 93,857 barrels.

Non-war plants were given the following quotas: Chalmette Refining Company, Chalmette, 6878 barrels; Eastern States Petroleum Company, Houston, 7885 barrels; Sinclair Refining Company, Corpus Christi, 7602 barrels. and Southport Refining Company, Texas City, 13,370 barrels.

PAW officials explained that Gulf Coast refineries have moved considerable quantities of products, both for war and civilian use, during the last few months and shipments, particularly in the past few weeks, have been so rapid that there has been a sharp decline in inventories.

It is intended that the additional crude to be processed will produce certain semi-critical products for the military services, for which there is increasing demand at this time.

PAW also set allocations for East Coast refineries, as follows: Mexican Petroleum Corporation of Georgia, Savannah, 1766 barrels; Continental Oil Company, Baltimore, 7000 barrels; Pan American Refining Company, Baltimore, 2360 barrels; Colonial Beacon Oil Company, Everett, 26,297 barrels; Tide Water Associated Oil Company, Bayonne, 54,000 barrels; The Atlantic Refining Company, Philadelphia, 80,000 barrels; Sinclair Refining Company, Marcus Hook, 44,000 barrels; Sun Oil Company, Marcus Hook, 70,000 barrels; Gulf Refining Company, Philadelphia, 41,000 barrels; American Bitumuls Company, Baltimore, 2200 barrels and Providence, 1400 barrels; Standard Oil Company of New Jersey, Bayonne, 108,892 barrels, and Baltimore, 21,793 barrels; Cities Service Oil Company, Linden, 13,000 barrels, East Maintree, 15,000 barrels and Petty's Island, 10,000 barrels; Socony-Vacuum Oil Company, East Providence, 3500 barrels; Paulsboro, 18,500 barrels, and Brooklyn, 18,600 barrels.

Extension of Drastic Eastern Gasoline Restrictions to Middle West In Offing

Extension of the East Coast's pleasure-driving ban to at least 15 Midwestern states was in the offing last week as criticism of OPA's handling of the gasoline situation continued to mount in and out of Congress.

The admission that such action was under consideration was made by Major J. B. Parten, PAW transportation director, before a meeting of the Congressional delegations from the "famine" states running from Virginia north.

Parten, who agreed with Administrator Ickes that pleasure driving has no place in a wartime economy, told the group that action on extension of the ban "can be expected soon." He told the Congressman, however, that there is little chance of carrying out its recommendation of bringing an additional 200,000 barrels of gasoline a day to the Eastern area by rail during the next 90 days.

Plans of PAW, he said, contemplate an East Coast supply by next April of 1,700,000 barrels a day, or 300,000 barrels more than normal peacetime requirements, but admitted that pipe-line construction is being hampered by difficulty in securing valves, which has necessitated a two-month extension of the time for construction of the big-inch to the coast, originally scheduled to be completed by June 1, and may delay the 20-inch products line planned to be completed by next January 1.

Members of the group, fighting to have oil control shifted from OPA to PAW, secured from Parten an admission that he believed the gasoline situation would be materially improved if PAW had full authority.

A number of bills to give Ickes control of oil rationing and price have been introduced, the most recent measures being sponsored by Representatives Fred A. Hartley of New Jersey and Wesley E. Disney of Oklahoma, the latter's measure also calling of an increase of 70 cents per barrel in the price of crude oil.

OPA Active

OPA, meanwhile, was feverishly active, announcing the introduction next month of a new type of coupon for truck gasoline supplies which it said would constitute an attack on the black market, and investigating charges of pleasure driving against a possible total of 20,000 motorists, more than 12,000 of whom were questioned over the week-end in New York alone.

While OPA officials appeared content with their effort to enforce regulations, thousands of motorists who could get no gasoline for their own cars and had difficulty in getting on over-crowded buses running on skeleton schedules were anything but complacent over the situation, which Washington warned could prevail for months to come.

Congressional Suggestions

Chief recommendations of the Congressional block were:

Giving full charge of oil to PAW.

Construction of another large pipe line to the Atlantic Coast.

Tighter rationing in the Midwest to divert supplies to the East.

Increased use of the inland waterways from the Great Lakes area to New York.

Monthly appraisal of supplies in the shortage area to avoid "overrun" distribution and consequent famine in some sections.

The disclosure that PAW planned to outlaw pleasure driving in the Midwest immediately brought opposition from delegations from that section, with Representative Charles A. Halleck of Indiana insisting that a Congressional investigation should be made before any action was taken.

As a matter of fact, however, it is probable that the ban would already have been in effect had it not been for the big-inch break. PAW officials have been working to that end for some time, as the completion of the big-inch to Norris City, the extension and expanded capacity of the Plantation line, the movement over the trans-Florida line and the opening of navigation on the Great Lakes and New York barge canal released railroad tank cars which it was proposed to put into service between Districts 2 and 1.

Since supply and demand in the Midwestern district are in pretty sharp focus, the taking of oil for the East would necessitate cuts in consumption, and Ickes had planned to ask WPB Chairman Donald Nelson to issue a directive to Price Administrator Prentiss M. Brown which would involve either

a general cut in rations or elimination of non-essential driving.

Members of Congress are urging that the Baruch committee which investigated the rubber program be re-convened to make a study of the Eastern gasoline situation.

Talking on the problem in the House June 8, Representative Hartley expressed the belief that if the Baruch committee "tells those of us on the Eastern Seaboard that we have to give up all but essential driving, our people will be only too willing to comply with that recommendation.

"But as the matter stands today," he added, "there is no really organized planning. There is nothing but confusion."

ODT also came in for blame in connection with the Eastern shortage, Congressman George H. Bender of Ohio charging it with inefficiency in the handling of tank cars. He asserted that the oil cars are not making the speed they should and told the House that if the movement was expedited it would be unnecessary to raid the oil supplies of the Middle West.

ODT reported that rail facilities washed out by Midwest floods have been restored to about 97 percent of normal, and the eastward movement of oil is approximately at pre-flood levels except for that part of the traffic moving through the temporary 20-inch link in the big-inch line.

Officials warned, however, that heavier rail shipments will not mean relief for the gasoline "famine" area, and even when capacity reaches the 1,590,000 barrels daily level now anticipated by September there may be no freer supply for the northeast.

"The northeast was hit by its most critical gasoline shortage when the overland movement was at an all-time high," they recalled, "and it may well be struck by another when the oil traffic is increased by a fourth.

"Much depends on demands for petroleum products on battle fronts far away. If plans for military and naval operations call for gasoline in quantities which keep pace with the rising eastern movement, then transportation triumphs may mean little to the civilian consumer, other than escape from even worse crisis which would occur otherwise."

Meanwhile Ickes, saying "we have never had any aversion to rationing civilians more severly in the Middle West," declared that further curb on consumption in that area will be imposed when it becomes possible to move so much out of that area that greater civilian restrictions become necessary.

There will not be a "moment's hesitations" in acting when the time comes, he said.

"Our policy has always been that we would continue to call upon the Mid-West and other sections to give us their transportation facilities and their products just as long as we could utilize those facilities and move those products," Ickes said. "Then, if shortages resulted in those areas, they would simply have to accept them. It has always seemed to us that this was a more logical procedure than to impose restrictions first, and then see whether this resulted in benefits to the East."

Byrnes Suggests Congress "Streamline" Investigations

Practically the first formal move of James F. Byrnes as head of the Office of War Mobilization was to call on Congress to streamline its investigations of war activities.

Pointing out that there has been a great duplication of investigations by House and Senate committees, Byrnes recommended to Congressional leaders that such inquiries be coordinated so that officials do not have to appear before three or four committees on the same subject.

This condition has been particularly evident with respect to Congressional inquiries into the oil situation, with as many as three House committees investigating the same phases at the same time and making it necessary for PAW officials to run from one committee room to another where, needless to say, they merely repeated their original testimony.

Senator Attacks Knox Over Elk Hills Deal

Raking over the muck of a generation ago to recall the Teapot Dome scandal, and denominating the 1941 consent decree in the "oil industry" anti-trust suit as "one of the dirtiest and most contemptible steals that has ever taken place," Senator William Langer of North Dakota declared in the Senate June 10 that the Navy-Standard Oil Elk Hills contract was an "oil give away" in which he saw "significance" in the fact that Ralph K. Davies and Howard Marshall are associated with PAW and Mark Thornburg is with the State Department.

Langer declared the contract, signed by Secretary Knox last November 18, was a "very hush hush deal," rushed to the White House and approved by the President "in a single day," which "permitted 43,000 acres of the richest oil lands in the United States, second in richness only to one field in Arabia, to be taken over in toto and developed during the next five years by the Standard Oil Company of California."

"After the President signed on November 18, and without waiting for any Congressional approval or any Congressional appropriation, Standard Oil of California rushed its drills and derricks on to Elk Hills and began drilling for oil," he told the Senate. "They began on November 20, and already have drilled eight excellent wells.

"Meanwhile," Langer charged, "the Secretary of the Interior, in charge of public lands, who is also the Petroleum Administrator, was not informed regarding this vital contract. Nor was the Justice Department, whose lands division is supposed to negotiate contracts regarding public lands, informed of this give-away of the Navy's vital oil resources."

Langer used the oil contract as a spring board for an attack on Knox, and other high officials of the Navy Department.

The contract has not been approved by Congress, although committees have twice considered the appropriation asked by the department to cover the cash payment to be made to Standard.

The agreement was announced by the Navy December 11, explaining that the company was to receive a cash payment of $1,750,000 for its equipment already installed in the field, and the right to withdraw from the field a maximum of 15,000 barrels of oil daily for five years of which, because it owned two thirds of the field, the Navy would receive two thirds. At the end of five years, the Navy has the right to shut down or restrict production.

Tanker Fleet Gains 15 New Boats in May

United States ship deliveries in May reached a new high of 175 vessels, 15 of which were tankers, it was reported by Rear Admiral Howard L. Vickery, vice chairman of the Maritime Commission.

The month's deliveries were better than four times Allied shipping losses for the period, and the Allied Nation's dry cargo fleet now is larger than when the war began.

Vickery admitted, however, that the present tanker fleet of the United Nations is smaller than at the start of the war, although tanker output during the past four months has been slightly higher than tanker losses.

As a result, the shipbuilding program for 1944 has been revised to provide for a larger proportion of tankers than contemplated by either the 1942 or 1943 building programs.

The emphasis on oil carriers will be adopted immediately, Vickery indicated, explaining that tankers constituted 18 percent of the tonnage in the 1942-43 programs, but not disclosing what the proportion would be next year.

In the meantime, however, numbers of Liberty ships are being converted into tankers of 9000-ton capacity; 15 such conversions were made in May alone.

It was also disclosed that the first of the oil-carrying concrete barges to be delivered had reached a South Pacific port. The concrete barge program totals 91, and the boats will be in service in the Atlantic within three months.

Opposition Offered to Dual Well Completions

Opposition to dual completions for the League City field developed at a hearing before the Texas Railroad Commission last week. George Echols objected to the plans presented by Phillips Petroleum Company. Representatives of Echols indicated that he preferred shutdown exemptions or an allowable increase, to any increase that might result from dual completions.

This is the first time that operators have objected to dual completions since the commission issued its first order permitting them in the Stowell field. This order was issued only a few months ago.

C. M. Langford, Phillips Petroleum Company engineer, said that the additional oil produced could be used by a refinery only 20 miles away. Langford asked for production of both sands into a common tank battery, a proposal which the commission has denied in the past.

Echols gained permission to file a brief after the hearing, contending that he did not have sufficient notice.

Hallanan Says Crude Price Fight to Continue

Declaring that PIWC will continue its fight for an increase in the price of crude oil, while the oil industry continues to do its job of supplying products to meet the demands of our fighting forces, Walter S. Hallanan, PIWC member spoke before the Bradford District Pennsylvania Oil Producers Association, last week.

At the same time he warned that policies of the office of Price Administration are heading the oil industry towards the most gigantic monopoly in the history of America.

"There has not been a day for many months," he said, "that some independent operator has not been compelled to sell his properties to one of a small group of major companies. Those few major companies today control almost 75 percent of the nation's oil reserves as compared to less than 50 percent controlled by them two years ago."

He continued that regardless of the result of the industry's fight to be accorded the same recognition given to other economic groups, it would continue to do its job. "The oil industry is not going to let the country down in time of war even though it be unfairly treated by the government," he said. He made it plain though that the industry would carry on its fight for an increase in the price of crude oil and refined products which, he declared, is necessary in order to stimulate exploratory drilling.

Engineers to Meet in Los Angeles, June 17

The annual meeting of the Petroleum Division of the American Society of Mechanical Engineers will be held in Los Angeles, June 17. W. F. Herbert of The Texas Company, Fort Worth, Texas, who is chairman of the division, has announced the following program:

"Requirements for Relief of Overpressure in Vessels Exposed to Fire," by James J. Duggan, C. H. Gilmour, and P. F. Fisher, Carbide and Carbon Chemicals Corporation; "High-Pressure Pipe Line Research," by F. W. Laverty and F. M. McNall, Clark Bros. Company; "Interpretation of Analytical and Volumetric Data in Terms of Field Measurements," by Doctor B. H. Sage and R. H. Olds, California Institute of Technology; "Southern California Gas Company's Butadiene Plant," by J. G. Rollow and H. L. Masser, Southern California Gas Company; "Portable Drilling and Servicing Machines," by James Moon, Franks Manufacturing Corporation and Hillman-Kelly; "Engine Wear and Its Measurement in the Study of Lubrication," by A. G. Cattaneo and W. Gasser, Shell Development Company.

Pennsylvania Association To Meet June 25

The twentieth annual meeting of the Pennsylvania Grade crude oil association will be held in Pittsburgh, June 25. The meeting will be limited to a single day in keeping with the policies urged by the federal government.

The principal speaker at the meeting will be Robert E. Allen, assistant deputy petroleum administrator, who will review the current situation with respect to oil supplies as a factor in the nation's war effort. Other speakers on the program will discuss similar phases of the problem of supplying the war machine and related industries with petroleum products, particularly high-grade lubricants.

The organization will elect a board of directors during the meeting. Reports by the president, Parker L. Melvin of Bradford, and the general secretary, Samuel F. Pratt of Oil City, will be made at the business session. Fayette B. Dow, vice president and general counsel, Washington, will address the concluding session.

A discussion on present methods of oil production and possibilities for increasing the output from the Pennsylvania grade region is planned as a supplementary part of the program. This discussion will be led by three practical operators in the field. A similar discussion on the improvement of finished products by the refineries will be included also. The complete program and other details about the meeting will be announced soon, according to Pratt.

Illinois Conservation Law Proposal Again Killed

A bill designed to provide an oil conservation program in Illinois was defeated by a vote of 23 to 16 when it was brought before the state senate, where it was introduced. Failure of the bill marked the second defeat of an oil-conservation law for Illinois, a similar bill being decisively beaten in 1939. As a result of the bill's failure, another blast at Illinois oil operations may be expected from Petroleum Administrator Ickes, who has long lambasted the state for failure to set up a conservation law.

Rubber Plant to Open at Baytown, Texas, June 28

Harvey J. Elwell has been named general manager of the "American-made rubber" plant to be opened in Baytown, Texas, on June 28. The government-owned plant will be operated by the synthetic rubber division of The General Tire and Rubber Company in association with the General Latex and Chemical Company of Cambridge, Massachusetts.

Elwell, president of General Latex and Chemical Company, has assembled a group of 30 chemists and production men for key positions in the synthetic operations.

The plant will be opened with ceremonies which will include participation by Governor Coke R. Stevenson of Texas, who has proclaimed the day "American-Made Rubber Day." Jesse H. Jones, Secretary of Commerce, and William M. Jeffers, rubber administrator, are scheduled to take part in the ceremonies at Houston and Baytown.

Industry will be represented by William O'Neil, president of The General Tire and Rubber Company; L. A. McQueen and T. S. Shore, General vice presidents; H. Stuart Hotchkiss, chairman of the board of General Latex; Warren MacPherson, General Latex director; Kenneth Osborn, General Latex vice president; and Harry C. Wiess, president of Humble Oil & Refining Company of Houston. Humble will provide butadiene for the Baytown plant.

Compact Commission to Meet in Pittsburgh June 26

The Interstate Oil Compact Commission will meet June 26 for its summer quarterly meeting at the William Penn Hotel, Pittsburgh. Meeting in open session, the commission will hear discussions of war and post-war problems of the petroleum industry and ways and means to alleviate shortages of gasoline and fuel oil.

The commission's executive, legal, research, engineering, regulatory practices, and economics advisory committees will convene Friday to do their work and prepare reports and recommendations.

Members of the commission will attend sessions of the annual meeting of the Pennsylvania Grade Crude Oil Association in the William Penn Hotel Friday June 25. Members of that association are expected to remain over for the general session Saturday.

Official representatives from Ohio, who recently enacted legislation authorizing Ohio's membership in the compact, will meet with the commission for the first time. Ohio becomes the thirteenth state to join in the compact. Other member states are Arkansas, Colorado, Illinois, Kansas, Kentucky, Louisiana, Michigan, New Mexico, New York, Oklahoma, Pennsylvania and Texas.

Salt-Water Conference In East Texas Field

A salt-water disposal conference is to be held in the East Texas field on June 19, at the East Texas Salt-Water Disposal Company, under the sponsorship of the Petroleum Engineers' Club of the University of Oklahoma. Speakers include Bryan W. Payne, president of East Texas Salt-Water Disposal Company, and Buck Morris, vice president.

District Two Committee Suggests Spacing Change

Personnel, manpower and operating problems were among subjects given the most time at the recent meeting of District Two production committee, which met in Findlay, Ohio, last week. H. B. Fell, president Simpson-Fell Oil Company, Ardmore, Oklahoma, and recently named chairman of the committee, presided.

The committee is asking its state subcommittees on well spacing and engineering, to conduct a survey of wells expected to be drilled, both on proven locations and wildcats, in order that the production division may assist the industry in its efforts to obtain the necessary materials to permit that amount of development which will result in an assured crude supply.

In order to simplify operations under PAO 11, the committee recommended to PAW that Supplementary Order No. 5 to PAO 11 be amended so as to provide priorities assistance to operators in Illinois, Indiana and the Western Kentucky area.

Also the committee voted to recommend to PAW that a supplemental order be issued which would permit closer spacing for shallower wells and priorities assistance for material necessary to drill in Ohio and that portion of Kentucky not covered by Supplementary Order No. 5 to PAO 11.

Dr. W. B. Emery, assistant manager

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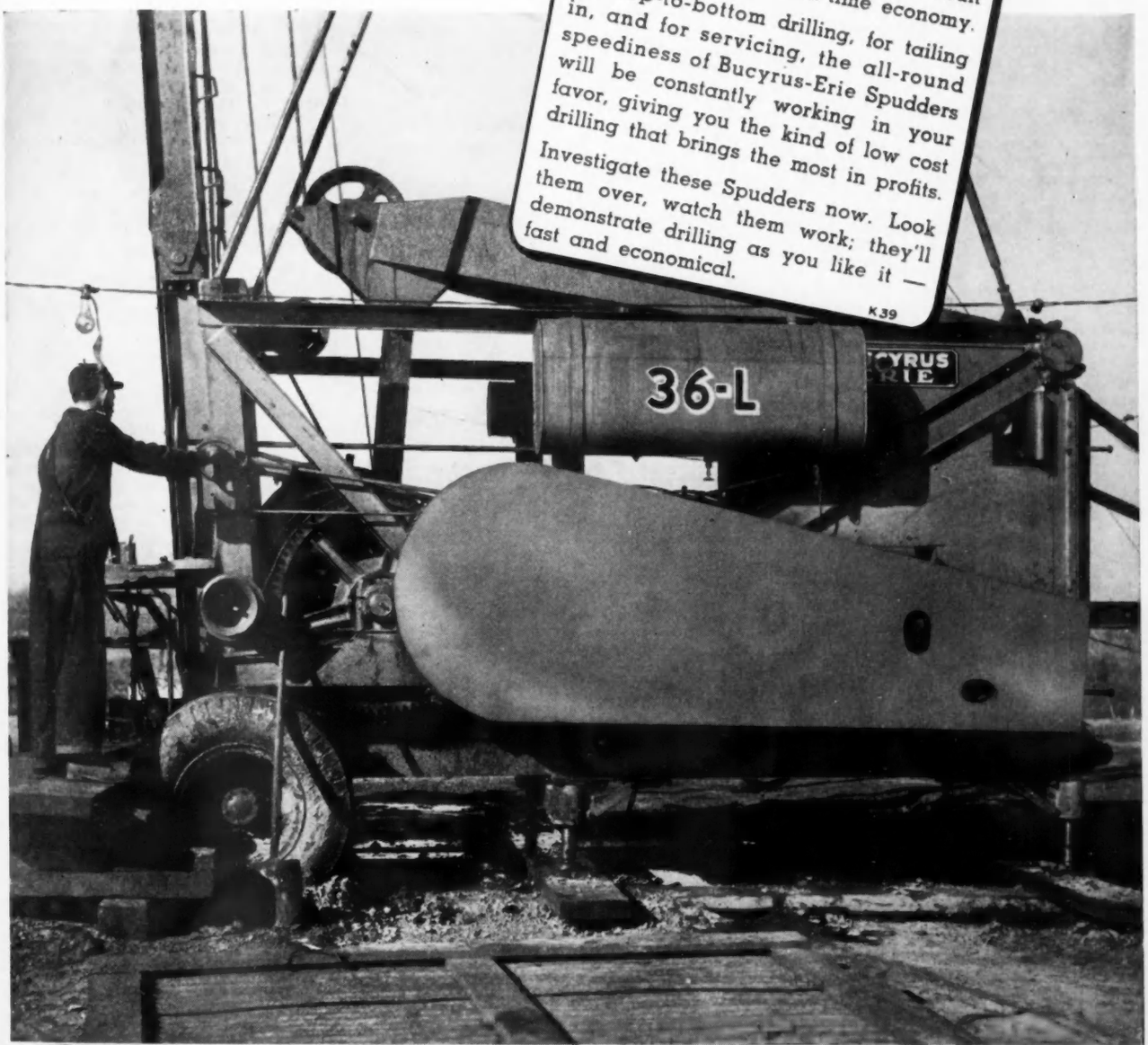

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of production and chief geologist of The Ohio Oil Company, has been named to membership on the committee to fill the vacancy left by O. D. Donnell. Dr. Emery was also named chairman of the production subcommittee for Ohio. H. N. Pardee, The Texas Company, Tulsa, was named vice chairman of the committee.

East Texas Salt Water Disposal Satisfactory

Marked progress in the disposition of salt water in the East Texas field during May has been reported by the East Texas Salt Water Disposal Company. An average of 94,468 barrels daily was injected by this system during the month, a total of 2,928,503 barrels.

The injection rate at the first of the month was only 70,000 barrels, but it rose to 110,000 barrels during the course of the month. The average for May was 15,033 barrels in excess of the average for April.

Part of the gain was accounted for by the completion of two new injection systems, one at Kilgore and one at Gladewater. These wells are able to handle all of the water from the wells to which the system is connected in those areas now.

The disposal company is connected to 1566 wells in the field. There are 18 injection systems operated which are owned by the company, and 7 which have been taken over from oil operators.

Some difficulty has been encountered by reason of failures of some of the wells to take water. In several instances it was necessary to shut down and clean out and acidize the injection wells. This problem is being studied currently by chemists of the University of Texas and several of the oil companies. Some change in the method of treating the water before it is returned to the sand is contemplated.

The report disclosed that the water injected has been increased from 2957 barrels last October to 94,468 barrels this May. In addition to that, other injection systems are handling enough water to bring the total for the field to 174,468 barrels daily for May; this was 57.03 percent of the water produced.

Meanwhile the primary objective of the operation has been obtained, as is indicated by pressure conditions in the field. The average pressure last October was 1020.71 pounds per square inch and it had dropped to 1019.16 pounds by May 1 of this year, a decline of 1.55 pounds in 8 months. During this time the oil and water withdrawals were approximately 750,000 barrels per day.

Salt Water Injection Plan Meets Opposition

Opposition to a salt-water-injection program for the Griffin pool, Jones County, was offered at a hearing before the Texas Railroad Commission last week. Falls Refining Company had asked for a salt-water-disposal plan and the protest came from Bradstreet, Bourn & Barclay, owners of an offset lease, and J. D. McCallum.

The protesting operators contended that the water would channel through the lime and ruin good wells in the field. McCallum declared that he had just been drowned out of two wells in East Texas and felt that the injection of water within the boundaries of the East Texas field was injurious.

Consolidated Oil Company and Bert Fields likewise sent letters to the commission objecting to the plan. Harold Neeley was the only operator to support the application of Falls Refining Company.

There is a great deal of water in pits now and some plan to dispose of it seems to be absolutely essential.

Extension of Estes Flood Program to Be Granted

Extension of its water-flooding program in the Estes field, Ward County, was requested by Humble Oil & Refining Company at a Texas Railroad Commission hearing last week. The company has been water flooding its Richter lease under provisions of an order effective July 13, 1942, which permitted the experimental operation for one year.

R. S. Dewey, engineer for the company, said that results were just beginning to appear. Some of the wells offsetting the injection wells have shown slight increases in production. He expressed the opinion that the project was well worthwhile and for this reason the company wished to continue.

The water is being returned to two horizons at 2500 and 2900 feet in the Yates sand. No water has been injected into the 3000-foot zone.

The company proposed a revised order which would permit operators to obtain water-flooding permits without a hearing, if the lease plan was approved by offset producers. The proposed order would eliminate gas-oil ratio surveys for marginal wells also.

Skelly Oil Company urged that the tests be eliminated for all wells in the field because of the shortage of tires, gasoline, and labor. Gulf Oil Corporation, however, objected to this change.

This stand was endorsed by Standard Oil Company of Texas. Joe Ballanfonte, engineer for the company, said that most of his company's wells had been penalized because of high ratios and that he was not certain full reports had been made by other operators in the field; nor was he sure that all wells had been penalized that have high ratios now.

There was no opposition to the extension of Humble Oil & Refining Company's program, and it appeared likely that the commission would approve the plan on an extended basis.

Indian Lease Sale

Sealed bids on restricted lands being offered for oil and gas lease will be opened Tuesday, June 15, at the office of A. M. Landman, superintendent, Indian Agency, Muskogee, Okla.

The offerings include 65 tracts of land with a total of 5,097 acres. The offerings by counties are as follows: Washington, one tract, 30 acres; Creek, one tract, 160 acres; Okfuskee, 12 tracts, 1,139 acres; Seminole, 17 tracts, 1096 acres; Pontotoc, eight tracts, 739 acres; Coal, one tract, 150 acres; Garvin, four tracts, 378 acres; McClain, six tracts, 355 acres; Grady, one tract, 100 acres; Stephens, 12 tracts, 737 acres; Carter, two tracts, 213 acres.

Corpus Christi Line Will Have to Be Rebuilt

Test runs of oil through Southwest Emergency Pipe Line, Inc.'s converted and coupled natural gas line between Refugio and Houston developed more than 400 leaks without attaining normal operating pressure. It has been recommended that Defense Plant Corporation approve the removal, reconditioning and welding of joints on the line, which consists of 58 miles of 14-inch and 92 miles of 16-inch pipe. A minimum of 4 months will be required to complete the work, which will cost about $2,000,000. Some sources even suggested that the line be discarded.

Defense Plant Corporation purchased the line last January for $2,625,000 while it was being used as a natural gas line by Houston Gulf Gas Company. Humble Pipe Line Company was detailed by Defense Plant Corporation to install 5 booster stations and operate the project as a combination crude and heating oil line that will function as a feeder for the big-inch and 20-inch products line that will terminate on the East Coast.

Southwest Emergency Pipe Line, Inc., was scheduled to supply 300,000 barrels of high-gravity crude oil from Corpus Christi district during June and 1,240,000 barrels per month during the following two months to the Longview-Norris City line. Substitute supply of sweet oil is not readily available so the transportation committee of PAW is negotiating for the temporary diversion of small tankers and large barges for movement of the oil from Corpus Christi to feeder lines in the Houston-Beaumont district. Boats can complete round trips within 4 days.

The West Texas-New Mexico sour-oil district cannot appreciably increase its scheduled deliveries to the big-inch to offset the temporary loss of the Corpus Christi supply as nearly all Permian Basin outlets are operating at capacity. The exception is Humble Pipe Line Company's West Texas-Corpus Christi 60,000-barrel daily capacity line, which is handling only 6000 barrels daily to Humble Oil & Refining Company's refinery at San Antonio, owing to latter's plant near Corpus Christi having been converted to processing products used in the war effort, and lack of transportation of crude out of the coastal terminal.

Stowell Hearing Ordered On Spacing Change

A hearing to amend the spacing rules in the Stowell field, Jefferson County, has been scheduled for June 30, at Austin, by the Texas Railroad Commission. Glenn McCarthy asked that the rules be revised to allow 330-990 spacing like that now provided by the Petroleum Administrator for War.

Recently this program has been under fire in Austin because it does not result in any uniform spacing plan if operators locate their wells exactly 330 feet from lease lines and 990 feet apart. Most of them prefer some program that will permit drilling in the center of 10, 20, or 40 acres.

Thus, if PAW permits only one well to 40 acres and operators wish to drill more wells after the war, the uniform spacing could not be obtained if 330-990 locations are drilled now.

Reduction Made in Stocks Of All Refined Items

For the week ending June 5, there was a continued downward trend in critical items, resulting in further reduction in stocks of gasoline, gas oil and distillates and residual fuels, and daily run of crude to stills. The only appreciable increase was in crude oil stocks which showed a plus of 2,092,000 barrels as compared with last week.

Actual decreases were as follows: daily run of crude oil to stills, 17,000 barrels; gasoline production, 24,000 barrels; production of gas oils and distillates, 735,000 barrels, and residual fuels, 167,000 barrels. Residual fuel oil stocks were decreased by 472,000 barrels.

Acute shortage of gasoline throughout the Eastern Seaboard has not been eased and there is apparently no hope of further relief immediately. The setback in crude deliveries caused by the flood of a few weeks ago is the cause of less fuel oil production, no doubt, and is probably accountable for the further decrease in fuel oil stocks.

As was pointed out last week, however, temporary conditions such as the recent flood only aggravate an already serious situation and do not have permanent affects. The real problem is the exceedingly heavy demands of industry and military forces. Meeting this demand under present conditions is bound to call for further reduction in civilian use of petroleum in areas far removed from production centers.

The losses and gains as shown in this week's figures can be considered as normal and reflect no unusual conditions.

As compared with a year ago, the big differences show up in stocks of fuel oil which were then 79,806,000 barrels as compared with 67,210,000 barrels at the end of last week. Gas oil and distillate stocks show slight gains this year. Gasoline stocks are lower by approximately 10,000,000 barrels. Weekly production of gasoline is up slightly, and this with the big decrease in stocks emphasizes the demand for motor fuel for the armed forces.

Crude production as compared with one year ago is up about 333,000 barrels daily.

R. H. SONNEBORN has been appointed sales manager for Chicago Nipple Manufacturing Company. He has had many years experience in the oil field trade.

Big Inch Crude Movement Again On Increase

War Emergency Pipe Line, Inc.'s crude oil shipments from East Texas to the Norris City, Illinois, terminal were averaging 240,000 barrels daily toward the end of last week as compared to 180,000 barrels daily one week previous. The increase was made possible by rail movements to the East Coast resuming normal service as railroads iron out congestion arising from floods in the Ohio valley region. The 24-inch carrier was scheduled to handle 270,000 barrels of crude daily in June. The temporary 20-inch crossing over the Arkansas River, is not retarding shipments.

No date has been set for the initial movement of West Texas-New Mexico sour oil through the big-inch, although this type of oil was slated to start north from Longview on May 18, or the day after the river crossing was washed out. Feeder lines from Houston-Beaumont quit moving Permian Basin crude into Longview after filling 480,000 barrels of tankage, except for Atlantic Pipe Line

Crude Oil Production in the United States

(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED June 5	June 12
Arkansas	72,800	73,950
California	764,252	774,550
Long Beach	32,370	34,150
Midway-Sunset	55,429	56,750
Kettleman Hills	39,098	43,550
Wilmington	93,420	94,900
Rest of State	543,935	545,200
Colorado	6,600	6,900
Illinois	213,300	224,800
Salem	31,500	32,100
Louden	36,700	42,100
Other New Pools	134,100	139,400
Old Pools	11,000	11,200
Indiana	13,750	11,400
Kansas	271,050	305,700
Kentucky	21,850	22,100
Louisiana	333,700	333,950
North Louisiana	87,000	85,550
South Louisiana	246,700	248,400
Michigan	61,650	58,050
Mississippi	54,300	52,800
Missouri	95	95
Montana	24,950	18,150
Nebraska	2,150	2,150
New Mexico	97,000	97,300
New York	15,000	14,150
Ohio	9,150	8,950
Oklahoma	328,750	334,650
Oklahoma City	58,250	59,500
Seminole Area	70,800	73,800
Rest of State	199,700	201,350
Pennsylvania	46,550	45,100
Tennessee	30	30
Texas	1,500,300	1,498,950
Upper Gulf Coast	378,950	381,900
East Texas Field	336,300	335,050
Rest of Eastern Texas	123,900	123,650
Lower Gulf Coast	134,900	133,600
Southwest Texas	58,650	56,700
South Central Texas	16,550	16,550
West Texas	228,500	229,100
North Texas	132,000	132,050
Panhandle	90,550	90,350
Utah	10	10
West Virginia	9,100	10,050
Wyoming	92,200	92,750
Total United States	3,938,537	3,986,535

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

ITEM	Crude Oil Prod. Barrels Daily	Crude Oil Prod. Week Ended	Runs to Stills Barrels Daily	Runs to Stills Week Ended	Crude Stocks Barrels	Crude Stocks Week Ended	Gasoline Stocks Barrels	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Barrels	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Barrels	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[4]4,120	10-18	266,187	3-29	99,727	3-29	[5]54,983	11-15	102,448	1- 4
1942	[4]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	49,861	11-14	95,857	1- 3
1943	4,020	5- 8	3,849	5- 1	245,752	5-29	94,159	3-20	42,913	1- 2	72,881	1- 2
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	82,205	6- 5	30,732	4- 3	66,991	5- 1

Trends in Week Ended:	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gas Oil & Distillate Production Weekly	Gas Oil & Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1942:									
January 3	4,038	3,961	244,440	13,797	92,987	3,855	49,357	6,918	95,857
January 31	3,871	3,848	250,740	13,292	97,810	3,817	40,674	6,640	91,189
February 28	4,016	3,675	259,373	12,131	105,635	3,799	34,547	6,813	88,285
March 28	3,820	3,667	263,208	11,663	105,624	3,661	31,756	6,344	83,045
April 25	3,581	3,506	257,073	10,535	102,897	3,267	29,240	6,869	81,107
May 30	3,877	3,522	255,023	10,478	95,355	3,034	31,384	6,993	79,628
June 27	3,719	3,581	253,364	10,713	88,396	.....	32,851	.....	77,304
July 25	3,691	3,658	249,262	10,864	82,281	.....	35,966	.....	77,816
August 29	3,964	3,697	249,007	11,300	80,831	.....	42,060	.....	78,034
September 26	3,909	3,802	242,785	10,954	80,550	.....	45,945	.....	78,943
October 31	3,901	3,731	239,266	11,153	79,159	.....	48,131	.....	79,166
November 28	3,878	3,736	234,850	11,269	78,854	.....	49,739	.....	77,796
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 22	4,006	3,698	243,660	10,300	85,331	3,682	32,193	7,442	67,717
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 5, 1943	**3,933**	**3,662**	.....	**10,632**	**82,205**	**3,063**	**32,577**	**7,505**	**67,210**
June 6, 1942	3,602	3,462	[4]255,023	10,285	93,192	3,402	30,604	6,723	79,806
Change:									
In week	—37	—17	+2,092	—24	—1,732	—735	+303	—167	—472
In year	+331	+200	—9,271	+347	—10,987	—339	+1,973	+782	—12,596
In year	+9.1%	+5.7%	—3.6%	+3.3%	—11.7%	—9.9%	+6.4%	+11.6%	—15.7%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, May 30, 1942.

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Company, which is accumulating a back log in the East Texas field after filling available tank cars at Longview and Jefferson, Texas, racks. The latter company is moving 41,000 barrels daily direct from the basin into East Texas.

Texas Commissioner Wants Higher Allowable

Texas Railroad Commission Chairman Beauford Jester last week urged an increase in the Texas allocation for July. He pointed out that the next statewide hearing will be held June 18, and asked that PAW recommendations arrive at least two days before.

"It is clearly apparent to us here on the oil producing end," Jester said in his wire to Petroleum Administrator Harold L. Ickes, "that unless crude oil production is appreciably increased in July there will be a critical shortage of crude oil at refineries in Texas during the period August 1 forward.

"Some refineries will be also down to tank bottoms by July 31, unless we appreciably increase the crude oil available to them. Consideration should be given in our opinion to the necessity for building up crude stocks for all the new refineries and rubber plants that will be starting up operation in July, August and September.

"Oil production cannot suddenly be jumped to meet any requirement, but we should gradually work up to the larger demands that seem certain to come during the third and fourth quarter of this year."

Texas Getting Data On Gasoline Stocks

Special data on gasoline stocks has been requested by the Texas Railroad Commission to be presented at its hearing in Austin on June 18. In a letter to each refiner and operator of gasoline and recycling plants, Commission Chairman Beauford Jester, last week asked that each file stock report showing the amount of gasoline on hand on January 1, and June 1, 1943. The data must be in commission offices prior to the hearing.

Phillips Enlarges West Texas Pipe Line

Phillips Petroleum Company is expanding its natural gasoline pipe line system in West Texas through the laying of a 7-mile 2½-inch extension from its big plant in Goldsmith field to Cities Service Oil Company's plant in the North Cowden field, Ector County. Phillips Petroleum Company has contracted for the 8200 gallons daily average output of the North Cowden field plant, and the products will be transported by pipe line to the buyer's Borger, Texas, refinery.

Sinclair Serving More Areas in South Texas

Sinclair Refining Company has enlarged its pipe-line activities in South Texas to embrace 6 additional pools in purchasing 35 miles of 4-, 3- and 2-inch lines from Humble Pipe Line Company. The system connects with the Fitzsimmons, Bridwell, Blanchard, Cadena, Tesoro and Agua Prieta areas, Duval County, and has been tied into the purchaser's Corpus Christi-Houston trunk line, which is exceeding its rated

capacity in moving 24,500 barrels daily. Humble Pipe Line Company was restricting its runs from the group of pools to 5 barrels daily per well owing to curtailment of oil movement from the district. Sinclair Refining Company has nominated 30 barrels daily per well.

Plymouth Builds Short Line to Olson Pool

Plymouth Oil Company has authorized the construction of a 5-mile 2½-inch crude line from its recently acquired 3-well property in the Olson pool, Crockett County sector of West Texas, to the Noelke pool, where connection will be made with the Crockett Gathering System in making deliveries to The Texas New Mexico Pipe Line Company. Plymouth Oil Company proposes to drill 7 wells in the Olson pool.

Shale Deposit in Brazil Is Being Developed

Production of about 300 barrels per day of shale oil from bituminous sands near Sao Paulo, Brazil, is hoped for by Companhia Itatig, which has concentrated its activities on this development. Heretofore the company was the only important private enterprise engaged in drilling for oil in Brazil, and it has withdrawn from the crude petroleum development activities.

Well-Drilling Decline Continues in May

Weekly average completion rate for the United States during May failed to hold to April totals by 16 wells per week, reflecting retarded activity throughout most of the oil producing territory. A few states did show more wells drilled during May and April, but considering the fact that five weeks were included in May against four in April, net results show a decline.

The average by week for May based on 5 weeks or 35 days, was 339 wells. For wells completed in 4 weeks of April, or 28 days, the total was 355. Weekly completions rate in March was 292, in February 320, and in January 346.

That the drilling line is not holding as compared with a year ago, is indicated by May, 1942, totals, when the weekly average number of completions was 396.

Emphasizing this fact also is the comparison for the first five months, January to May inclusive, of 1942 and 1943. The percentage of difference in the number of wells completed for the two periods is a minus 24.6 for this year. Totals for the two periods show 7263 wells reported as completions from January to May inclusive, this year, as against 9204 for the same period in 1942.

Among the few states completing more wells this year than a year ago, the most pronounced are California and Kentucky. California, due to relaxation of regulations, has drilled 615 wells compared with 315 a year ago, which represents an increase of 81 percent. New discoveries in Kentucky have resulted in that state having 115 completions against 57 a year ago, which is a gain of 92 percent.

Rigs in operation the first of June were down slightly from a month ago, there being 2743 compared with 2756 on May 1, and in contrast with 3899 a year ago. Again only California and Kentucky show important improvement.

Texas continues to be the most active region, but both its completions and rigs in operation represent but slightly more than 50 percent of its 1942 rate.

AIME Auxiliary Gives Ambulance to Service

The Woman's Auxiliary to the American Institute of Mining and Metallurgical Engineers has presented an ambulance to the United States Army. Mrs. Thomas T. Read, president of the Auxiliary, made the presentation, and Captain John J. Morrissey accepted the ambulance on behalf of the Army. This ceremony was held at headquarters of the institute in New York.

Completion Rate Continues Low During Month of May

(Figures compiled from weekly reports of editorial staff men, with following exceptions: Arkansas data from Arkansas Oil & Gas Commission; California from A.P.I. except for latest month; Illinois from Illinois Geological Survey except for latest month; Indiana from Indiana Division of Geology; Missouri from Missouri Geological Survey; Bradford and Kane-Clarendon, Pennsylvania, from The Producer's Monthly; Tennessee from Tennessee Division of Geology)

State or District	MONTHLY COMPLETIONS: May, 1943 — Details for May, 1943 — New Wells *Oil	Gas	Dry	Oth-ers[6]	Old Wells Deep-ened	Total Completions — May, 1943[1]	April, 1943[3]	May, 1942[2]	Total Footage May, 1943	CUMULATIVE COMPLETIONS: First 5 Months — Details, Jan.-May, 1943 — New Wells *Oil	Gas	Dry	Oth-ers[6]	Old Wells Deep-ened	Total Completions — Jan.-May, 1942[5]	Jan.-May, 1943[4]	Percent Change in Weekly Av'age	Total Footage 5 Months 1943	RIGS IN OPERATION — Details for June 1, 1943 — Drilling	Rigs Up	Shut Down	Total: Drilling RU and SD — June, 1, 1943	May, 1, 1943	June 1, 1942
Alabama															3									5
Arkansas	16		9			25	21	16	135,102	55	1	29	2	1	88	82	+ 2.5	478,923	32	6	16	54	52	48
California	113	6	27		5	151	124	56	489,689	446	9	152		8	615	325	+ 81.1	1,993,192	225	46	22	293	290	267
Colorado							3			4		4			8	4	+ 91.0	28,229	8		7	15	15	28
Florida																			1			1	2	
Georgia															2						1	1	1	
Illinois	92	1	69	1	7	170	160	178	415,599	445	9	279	12	21	766	763	— 0.4	1,871,379	113	16	43	172	182	240
Indiana	4		15			19	15	22	30,263	36	2	61		4	103	152	— 36.0	178,619	18	3	14	35	50	73
Iowa																			1		1	2	2	1
Kansas	92	2	92	4	1	191	127	102	656,972	317	13	304	11	15	660	626	+ 0.6	2,191,230	167	24	7	198	209	210
Kentucky	18	1	10			29	17	9	66,632	69	4	41		1	115	57	+ 92.5	229,633	45	6	4	55	54	23
Louisiana	34	6	32			72	35	86	482,368	129	14	95			238	432	— 47.3	1,687,887	83	11	22	116	149	277
North	13	6	16			35	15	47	135,728	43	11	48			102	199	— 51.0	452,124	32	8	12	52	64	99
South	21		16			37	20	39	346,640	86	3	47			136	233	— 44.5	1,235,763	51	3	10	64	85	178
Michigan	20		25		2	47	42	47	128,614	81	5	100		6	192	264	— 30.4	506,482	63	16	38	117	109	197
Mississippi	2		2			4	2	5	29,783	4		8			12	57	— 81.4	75,373	9	1	4	14	17	3
Missouri			4			4			4,124	1		6			7	15	— 57.0	7,548	2		1	3	2	5
Montana	10	3				13	20	14	34,316	38	24	9			71	65	+ 6.6	151,044	37	6	8	51	43	59
Nebraska		1				1		8	6,920		1				1	24		6,920					2	23
New Mexico	18	1	4			23	23	33	66,865	64	3	33		6	106	166	— 39.2	297,185	50		17	67	65	111
New York	68	1		40		109	78	78	152,228	308	3	2	152		465	467	— 4.9	643,021	91	26	15	132	133	160
North Dakota																			1		1	2	1	1
Ohio	9	30	21		1	61	68	67	147,359	52	175	110	1	5	343	442	— 26.1	878,019	152	22	38	212	197	211
Oklahoma	44	8	45	4	9	110	114	73	352,596	202	44	239	22	40	547	631	— 17.3	1,684,779	207	22	10	239	224	254
Oregon																					1	1		2
Pennsylvania	103	24	5	92	1	225	223	353	373,942	481	110	27	442	7	1,067	1,602	— 36.3	1,802,515	202	34	39	275	283	542
South Dakota																			1		2	3	3	2
Tennessee		1				1		2	1,025		2				2	6	— 67.5	2,383	4		1	5	5	6
Texas	185	14	177		13	389	287	378	1,668,566	792	64	650	15	50	1,571	2,704	— 44.5	6,521,622	457	24	99	580	575	1,017
E. T. Bor.Co.'s	1					1	1	4	6,100	6		1			7	6	+ 11.5	43,632	6		1	7	6	9
E. Tex. Field													2		2	13	— 85.4	4,280						1
Rest of E. Tex.	9	1	15			25	20	24	137,952	44	2	46			92	174	— 50.0	490,473	30	3	5	38	34	51
North Texas	26		58		3	87	63	52	230,391	133		203	12	13	361	431	— 20.0	959,378	81	6	31	118	103	200
West Central	12	1	19			32	32	28	72,097	35	8	86		5	134	164	— 23.0	296,288	31		10	41	44	83
West Texas	70		18		8	96	70	112	407,635	278	3	64		24	369	791	— 55.5	1,556,648	166	8	30	204	189	276
Panhandle	11	3	1		1	16	10	32	46,466	50	22	11		6	89	210	— 60.0	256,531	24	1	2	27	27	44
Upper Coast	18	1	15			34	16	37	253,866	62	3	45			110	224	— 52.8	830,229	44	3	7	54	61	139
Lower Coast	25	7	25		1	58	49	55	345,548	134	22	74	1	2	233	412	— 46.4	1,423,194	44	2	7	53	67	113
Southwest	13	1	24			38	19	23	164,149	47	4	95			146	219	— 36.5	584,399	24	1	5	30	33	64
South Central			2			2	7	11	4,362	3		25			28	60	— 57.1	76,570	7		1	8	11	37
Utah																			3		4	7	4	5
West Virginia	6	30	9			45	51	54	132,697	33	153	43		11	240	282	— 18.6	676,170	35	5	8	48	50	79
Wyoming	5		1			6	10	3	33,992	38	1	7			46	33	+ 33.3	194,396	31	2	12	45	37	50
Total U. S.	839	129	547	141	39	1,695	1,420	1,584	5,409,652	3,595	637	2,199	657	175	7,263	9,204	— 24.6	22,106,549	2,038	270	435	2,743	2,756	3,899

* Includes distillate wells. [1] Wells completed in 5 weeks, or 35 days, ended May 29, 1943. [2] Wells completed in 4 weeks, or 28 days, ended May 23, 1942. [3] Wells completed in 4 weeks, or 28 days, ended April 24, 1943. [4] Wells completed in 21 weeks, or 147 days, ended May 23, 1942. [5] Wells completed in 22 weeks, or 154 days, ended May 29, 1943. [6] Water input, gas injection, and salt water disposal wells.

At night on a lonely beach

Dim shadows—low on the horizon—waves foaming on a sandy beach—then pushing through the darkness, landing barges bring threat of invasion to Axis-ruled lands!

Landing boats and tank lighters are grounding on the beach and our army is establishing a beach head. This scene has been enacted at Guadalcanal—in North Africa and at little-known harbors in New Guinea.

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Here at Foote Bros. new techniques and new manufacturing know-hows are responsible for gears and speed reducers of radically different design and construction—gears light in weight and of extreme precision for aircraft engines—gears of giant size and super toughness designed to stand the grueling punishment that only war can give.

But when the war is won and these same techniques can be applied to peacetime use, American manufacturers may look forward to revolutionary developments in all phases of power transmission.

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Intensive Development of Oil Fields Has Increased Petroleum Output of Peru

Although there has been a reversal of the downward trend of annual petroleum production in Peru, it is not indicated that any further sharp increase in output is in store. Recent increases have reflected more intensive development of old fields, rather than development of any new, promising areas; while there has been no leasing or prospecting to point the way to additional discoveries.

After having declined steadily from an all-time peak of 17,593,000 barrels in 1936 to 11,922,000 barrels in 1941, Peru's oil output recovered about 13 percent in 1942, in totaling roundly 13,500,000 barrels, as operators encountered demand for all they could produce. The increase was accounted for largely by Compania Petrolera Lobitos, operating in Northwestern Peru. International Petroleum Company showed only a small gain, and the government's production was down about 20 percent.

There has not been any exploration in Peru during the past year, and leasing activity has been at a low level. Interest of private oil companies in development in Peru has been reduced in the past few years by the government's refusal of applications for concessions and by increases in taxes on oil. It is considered exploratory work itself, having employed United States seismograph companies to do work for it.

The newest oil field in Peru is Ganzo Azul, in the eastern part of the country, near the head of navigation on the Pachitea River. That field was discovered in February, 1939, and it now is producing more than enough oil for supplying the surrounding district, the chief commercial center of which is Iquitos. In addition, according to plans, the field will supply petroleum for shipment down the Amazon River in barges, for marketing in Brazil and Uruguay. It is pointed out that the field will be of great importance in development of the vast Amazon Valley, which henceforth will supply increased quantities of rubber and other essential materials.

Discovery well of the Ganso Azul field was Compania Ganso Azul's Agua Caliente 1-A, completed February 26, 1939, for 750 barrels of 45-gravity oil per day from Lower Cretaceous at 1174 feet. It is 20 miles above the confluence of the Pachitea River with the Ucayali River, being 3000 miles by water from the mouth of the Amazon and 300 miles northeast of Lima. Most of the trip to the field from Lima can be made by motor in 2 days, and the whole trip by plane in a day, crossing the Andes at 15,000-foot altitude. The Ganso Azul field apparently is a very important reserve, being on an anticline 16 miles long and 7 miles wide, which has 3600 feet of closure and including 50,000 acres within the closing contours.

Prior to discovery of Ganso Azul, Peru's production was largely from three fields on the northwestern coast, La Brea-Parinas, Lobitos, and Zorritos, named in order of importance, although there is also small production in the Pirin (Huacane) area, adjoining Lake Titicaca. The La Brea-Parinas production is the oldest and westernmost in South America. Producing 38-gravity oil from Eocene sands at 60 to 6000 feet, from a faulted and folded structure, with productive area of about 13,500 acres, the field has around 1750 producing wells yielding together about 25,000 barrels per day. The field is wholly owned by International Petroleum Company, subsidiary of Standard Oil Company (New Jersey). Cumulated production is in excess of 225,000,000 barrels.

Second most important field of northwestern Peru is Lobitos, immediately north of the La Brea-Parinas field, operated by La Compania Petrolera Lobitos. It has similar geological conditions to La Brea-Parinas but only about 2000 acres of productive area, with output of approximately 7000 barrels per day, from depths of 3000 to 6000 feet. Since the beginning, the field has produced about 55,000,000 barrels.

The Zorritos field, 70 miles north of Lobitos fields, over 50 years old, and with only negligible production from a few wells, has been operated by the government of Peru for several years, following purchase from F. G. Piaggio & Sons. Production is from Miocene sands on a faulted structure at depths of 300 to 1700 feet, within a productive area, not yet fully defined, of about 400 acres.

Aside from producing its own requirements and shipping oils to Brazil and Uruguay, Peru also exports some oils to Chile, Argentina, and Bolivia. However, production was on a downward trend from 1936 through 1941, after which the above mentioned increase occurred in 1942.

Peru uses its petroleum as the prnicipal fuel in its industrial operations, despite having extensive coal deposits, the oil being more economical. Fuel oil is used for firing boilers in power plants and factories in and around Lima, where most of the country's manufacturing plants are located. Locomotives of the Central Railway also operate on fuel oil.

Recent trends of annual production

and consumption of petroleum in Peru have been as indicated in an accompanying table.

Peru has one large refinery and two small skimming plants. International Petroleum Company has a skimming-cracking plant at Talara, in the La Brea-Parinas area, with capacity for handling 20,000 barrels of crude daily, the cracking capacity being about 7000 barrels per day. At Zorritos is a 1000-barrel skimming plant of the government for processing crude form Zorritos field, while Compania de Petróleo Ganso Azul has a 1000-barrel skimming plant at Aguas Calientes for handling production from the Ganso Azul field.

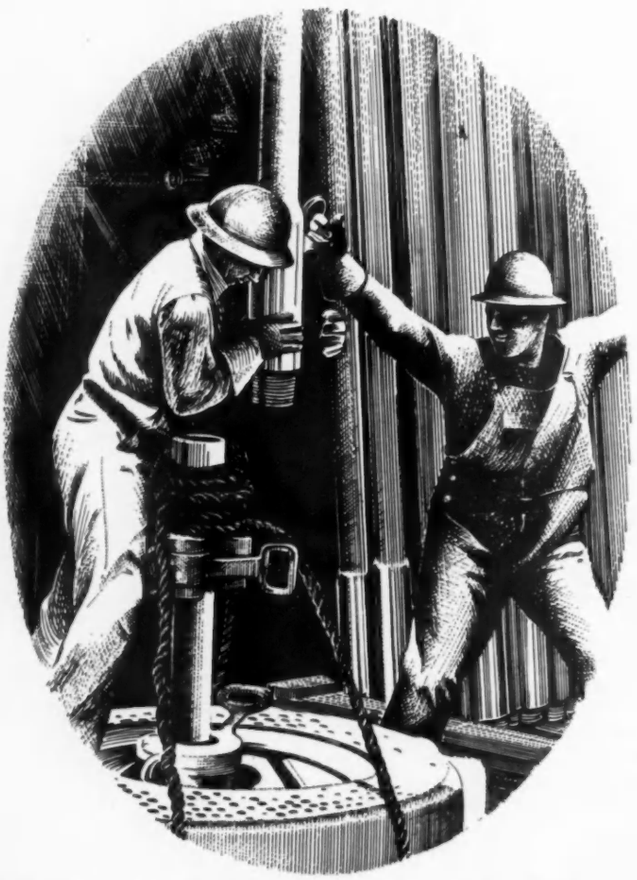
The war has caused some curtailment of the use of gasoline in Peru, as there has been a pronounced decrease in operation of automobiles and trucks, due to shortage of motor vehicle parts and tires. However, total demand for petroleum has been relatively large, in reflection of Peru's domestic use of fuel oils and the good export demand.

Oil Production in Peru

Year	Crude Oil Production (Barrels)	Petroleum Consumption (Barrels)
1936	*17,593,000	
1937	17,457,000	
1938	15,839,000	2,570,000
1939	13,508,000	2,380,000
1940	12,126,000	3,197,000
1941	11,922,000	3,100,000
1942	13,500,000	3,000,000

*All-time peak.

What's wrong with this picture?



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Record High Cost Foundation For Canadian Derrick

A probable all-time high in the cost of drilling sub-structures will be set by Socony-Vacuum Oil Company and Cities Service Oil Company in connection with the drilling of a wildcat well in waters off Prince Edward Island, Canada.

The cost of the derrick foundation which is located at a considerable distance from the shore will run, it is estimated, at around $200,000. The wildcat is located in Hillsborough Bay, adjoining Northumberland Straight which separates Prince Edward Island from New Brunswick, Nova Scotia. It is the second well in this general area, Cities Service having drilled the first well to a depth of 6955 feet without having developed production. The first well was located on Governor's Island.

Canadian Government Will Aid in Drilling for Oil

Wartime Oils Ltd., federal government concern, will charge 3½ percent interest on money advanced for oil drilling in Alberta and will collect a small gross royalty on production. Its policy was announced by directors after a meeting with Federal Oil Controller G. R. Cottrelle.

The board approved several applications for financial assistance from companies which plan to develop oil acreage. Everything will be done to get these operations under way immediately.

The directors are A. A. Carpenter, Edmonton; L. D. M. Baxter, Winnipeg; A. H. Mayland, J. Grant Spratt and K. J. Morrison, Calgary. Carpenter was elected president; Spratt, vice president, and Morrison, secretary-treasurer, an addition to the board.

C. J. Stewart was appointed field manager. Retired some years ago, he was formerly sales engineer of oil equipment and later connected with drilling one or two wells in Alberta.

Carpenter is former chairman of the Alberta Public Utilities Board. Baxter is general manager of Osler, Hammond & Nanton, which manages Calgary and Edmonton Corporation, Security Assets Ltd. and the Ross estate and controls the major acreage on the west flank of Turner Valley.

Wartime Oils Ltd. is interested in developing this acregae in which private capital has shown little interest.

Will Build Plant for Taking Oil from Sand

E. A. Smith, newly appointed vice president and managing director of Abasand Oils Limited, arrived at Edmonton, Alberta, recently, and said completion of a processing unit for the McMurray oil sands with an ultimate capacity of 600 barrels a day will be undertaken as soon as possible.

The head of the newly constituted company said a test drilling program also would be inaugurated to serve the plant requirements.

In announcing government purchase of the Abasand Company recently, Munitions and Supply Minister C. H. Howe said at Ottawa that an estimated $500,000 would be spent on a plant development program in the McMurray field.

U. S. Field Operations

Illinois Basin

Clinton County Wildcat Has Weiler Saturation

Black & Pierson's Kluth 1, SW SW SW 22-2n-1w, Clinton County, a mile south of Shattuc, recovered 6 feet of saturation in Weiler sand at 1293-99 feet, but was drilling ahead to Devonian. The core was tight but some observers believe that the formation might produce commercially.

Clay County: L. G. Waggoner's Pilcher 1, C SW NW 13-5n-5e, is being completed on pump after swabbing 175 barrels of oil in 24 hours from McClosky at 2461-66 feet. This well is a mile east of Iola field and some observers list it as an extension of that area rather than a discovery. It already has attracted three offsets, the deepest being Kingwood Oil Company's Danks 1, 14-5n-5e, drilling below 2000 feet.

Franklin County: Ohio Oil Company's U. S. Coal & Coke Company 1, NE NE NW 13-6s-3e, is being completed as a producer in Lower O'Hara lime, just above McClosky, at 2895-2912 feet. It is expected to make about 75 barrels per day.

Washington County: The Texas Company's Kokesh 1, SW SW SE 32-2s-4w, 9 miles west and 3 miles south of Nashville, in wildcat territory, was drilling below 1800 feet, and scheduled to be taken to Devonian lime.

Kentucky

New interest in western Kentucky was centered in Daviess County, about 12 miles southwest of Owensboro, where Miller and Shiarella's Miller 1, NE NE NE 12-N-27, discovery well, continues to pump 165 barrels a day from Benoist sand. Six operations are now drilling in the vicinity of the discovery.

Henderson County: Carter Oil Company's Cottingham 1, SW NE SE 17-O-23, 8 miles south of Henderson, is moving in materials for a McClosky test.

Trans-Production Company's Rash 1, NE NW SW 18-Q-22, wildcat 5 miles northeast of Smith Mills pool, is moving in rotary.

W. F. Lacy et al's Sherill 1, SW SE SE 9-Q-22, wildcat, was drilling at 2262 feet, near top of Cypress. Starting at surface elevation of 363 feet, Glen Dean was topped at 1882 feet.

Sinclair Prairie Oil Company's Bradley 1, NE 8-N-23, wildcat, 2½ miles east of Poole, was swabbing 5 barrels of oil an hour after 10-quart shot in Tar Springs at 1939-51 feet.

Union County: Carter Oil Company's Frusselburg 1, NW SE SE 24-P-21, wildcat, 3½ miles south of Smith Mills pool, is building rotary derrick. F. H. Brown is contractor.

Oil Is Ammunition

Petroleum has made total war possible, for it has shrunk the world to the size of a small country before its advent. In pre-petroleum days, only a small fraction of a people could participate in war for the mere transportation of the supplies for the fighting forces precluded it.

There is no weapon of offense or defense in modern war that does not require petroleum. Transportation from our shores to the very battle front, which is three fourths of the problem in global war, is dependent, 90 percent, on oil.—JUDGE WILLIAM P. COLE, *former member of House of Representatives from Maryland.*

Oklahoma

Osage County Discovery Lease Changes Hands

Northern Ordnance, Inc., has purchased W. A. Davidson's discovery well and 160-acre lease 10 miles northwest of Tulsa in Osage County and plans to develop shallow production found in Bartlesville sand in the area. The sale is subject to the approval of the assignment by the Department of Interior and the purchase price was reported $100,000. Northern Ordnance, no doubt, will be one of the bidders for three adjacent tracts at the next Osage lease sale. The discovery well is Davidson 1, SW SE 6-20n-12e, and is producing from Bartlesville sand topped at 1513 feet. Total depth is 1524 feet. Well is being cleaned out after a 30-quart shot. No production estimate has been made.

Beckham County: Northern Ordnance, Inc., found a showing of oil in granite wash at Crawford 1, C NW SE 25-9n-22w. The show was encountered at 5260-90 feet and pipe was set at 5371 feet. Total depth is 6010 feet. Pipe will be perforated for test of the oil show.

Logan County: Gas production in the Lovell pool was extended a half mile north by Champlin Refining Company's Frey 1, SW NE SE 9-18n-4w. The company planned to abandon the well as a failure and was pulling pipe when the well blew out an estimated 20,000,000 feet of gas daily. Gas is believed from sand at 3400 feet. Casing has been recemented. Hole was drilled to 6217 feet in second Wilcox which had salt water and then was plugged back for tests which failed in other zones.

Logan County: Preparations were under way to spud a wildcat test at Guthrie after a complicated leasing campaign in which the operators signed up more than 1000 lot owners. Eason Oil Company, Sunray Oil Company and Cities Service Oil Company will drill the test which will be Cather 1, NE NW NW 16-16n-2w. The test is scheduled for 6000 feet.

Pottawatomie County: Stanolind Oil & Gas Company's Perkins 1, SWc 10-8n-3e, has set pipe to 5468 feet and tests will be made through perforations. The best bet probably is at 4856-69 feet where a drill-stem test showed 1,000,000 feet of gas and 2525 feet of oil.

Kansas

Wildcats Open Two Pools, Two More Are Showing

Wildcat activity in Kansas is continuing to pay dividends. Two wells are definitely established as pool openers this week and two tests are showing prospects of new production.

Ellis County: In the southern part of the county between the Madden and Ruder pools, B. and R. Drilling Company's Leiker 1, C N½ NW NW 14-15s-18w, a failure in the Arbuckle, is producing from Lansing-Kansas City lime at 3292-96 feet. After casing was perforated the well swabbed 10 barrels of 38-gravity oil per hour. Arbuckle at 3622 feet was not worthwhile.

Harvey County: J. J. Kynn et al's Havely 1, C SW SE 17-23s-3w, more than a mile from nearest production in the Stuckey pool, is considered a Mississippi-lime pool opener after flowing 5 barrels of oil an hour and 3,500,000 feet of gas daily as the well was cleaned out. Mississippi was topped at 3254 feet with pay logged at 3297-3308 feet, 3350-56 feet and 3358-63 feet; total depth 3365 feet. Operators plan to acidize and are building tanks for production test.

Rice County: Three miles north of the Smyres pool, Nelson Drilling Company has Perry 1, NW SE 11-19s-6w, showing for a pool opener in Mississippi lime topped at 3420 feet. Good saturation was reported. Total depth is 3432 feet. Seven-inch casing is being run for test. The well is located on acreage farmed out by Continental Oil Company.

Russell County: Kingwood Oil Company et al's Bouska 1, NWc NE 14-15s-11w, more than 3 miles northeast of the Davidson pool, cored saturation in sand topped at 3323 feet. Saturation was encountered at 3324 feet. A show of dead oil was found in Lansing lime.

Pratt County: The fourteenth top-potential well in the Carmi pool is Magnolia Petroleum Company's Binger 3, C NE NW 31-26s-12w, which is producing from Arbuckle dolomite at 4292-4323 feet. Well was treated with 3000 gallons of acid. Only one well in the pool carries a potential of less than 3000 barrels daily.

West Texas

Yates Field Has Oil Showing in Ellenburger

The Yates field, rated as the most prolific shallow field, entered a firm bid for participation in the Ellenburger development now sweeping across the Permian Basin when Standard Oil Company of Texas' Smith-Douglas 1, southwest edge of the structure, indicated production from dolomite topped at 8709 feet with elevation of 2595 feet. Drill-stem test at 8650-8731 feet yielded 45 feet of 43-gravity oil and 15 feet of oil-cut mud along with fresh water blanket. Coring was resumed to

establish thickness of the oil zone before running pipe for completion.

This initial deep test for the Yates structure failed to encounter anticipated production in the Lower Permian and Simpson series, and entered Ellenburger considerably lower than projected by geophysics and subsurface. The test is 9¾ miles west and 3798 feet lower on Ellenburger marker than Moore Exploration Company-Olson Oil Company's Halff 2-C, Crockett County failure, that is 3 miles east of nearest Yates field production. The latter recorded oil shows in Middle Permian. However, Smith-Douglas 1 is 556 feet high to Humble Oil & Refining Company's White-Baker 1, failure 8¼ miles west. The latter logged 1345 feet of Simpson in contrast with 979 feet logged by the Yates field test.

Deep production rights within and near the Yates field have been given a high potential value since the completion of the first Ellenburger producer in the Big Lake field. Development will proceed as equipment and manpower will permit. Some doubt prevails as to whether a granite plug will be encountered near the apex of the structure.

Winkler County: Amon G. Carter's Walton-Pure 2-C, Ellenburger discovery for the Keystone field, attained more oil pay and reduced its gas-oil ratio to permissive level in coring to 9655 feet, or 438 feet in the gas-distillate and oil zone. The well flowed 121 barrels of 40.4-gravity oil with gas-oil ratio of 1660/1 in 70 minutes when tester was used at 9630-55 feet. Tubing will be run for completion. This strike has the thickest Ellenburger pay section in Texas. Stanolind Oil & Gas Company and Shell Oil Company's Blue 1, east edge of the county, was testing 7-inch, cemented at 10,691 feet, or 6 feet off bottom, preparatory to perforating Ellenburger oil saturation topped at 10,493 feet.

Deep Projects: Sinclair Prairie Oil Company's Ratliff-Bedford 1, C NW NW PSL 14, Block 73, Southwestern Andrews County, will drill to Ellenburger or 11,000 feet to explore a 6700-acre block purchased recently for $168,000 cash. The company is starting a similar project in Winkler County. In Eastern Dawson County, Gulf Oil Corporation's Dean 1 will drill to 9500 feet, or water in Ellenburger, with a 41,000-acre supporting block. Stanolind Oil & Gas Company will start a deep test shortly on its 12,000-acre block north of Bovina, Parmer County.

Yoakum County: Rowan Drilling Company's Dixon-Amerada 1, 4 miles northwest of Bennett sector of the Wasson field, and involving a deeper-seated structure, was awaiting drill-stem test after logging broken saturation at 5395-5440 feet. Top of Andres was called at 4760 feet with elevation of 3658 feet.

ALFRED T. TOWNLEY has been named manager of the annuities and benefits department of the Standard Oil Company of New Jersey, succeeding the late W. G. Gillson. Townley started with the company as an office boy in the treasurer's department in 1920 and since 1933 has been in charge of checking, analyzing and preparing all retirement, special sickness and death cases for consideration by the company's annuities and benefits committee.

North Texas

Montague County Well Has Strawn Production

Continental Oil Company's Vaughn 1, north offset to the Illinois Bend discovery in Northeastern Montague County and near Oklahoma, proved shallower pay for Strawn series in flowing 105 barrels of oil on 7-hour test through ¾-inch choke from sand at 3463-71 feet. The discovery showed production possibilities in this zone in drilling to Ellenburger at 4918-82 feet, but completed as a pumper in sidetracked hole from sand at 3860-65 feet. Development will likely spread to the bed of Red River.

Continental Oil Company's Scheller 1, southwest offset to the Bend lime discovery in the Mueller pool, Montague County, flowed 127 barrels of oil in 1 hour when tester was used at 6041-60 feet in Bend, topped at 6031 feet, 16 feet low. Base of Bend was called at 6062 feet, and the well will be completed in shale at 6137 feet. Stanolind Oil & Gas Company's Cobb 1, 2 miles northwest of Bowie, entered Simpson at 7129 feet and was drilling dry lime at 7315 feet, and Reed 1, situated on Nocona-Ringgold production trend, was fishing at 4324 feet.

Jack County: Continental Oil Company's Weir 1, 3 miles southwest of Myers pool, nearest production, filled 2000 feet with fluid, including 210 feet of oil, after perforating Buttram sand at 2327-39 feet, having plugged back from Ellenburger at 5825-6011 feet. Squeeze job will be made to try for water shutoff.

Archer County: Frank Buttram et al's O'Donohoe 1-B, 3⅜ miles southeast of Mankins pool, nearest deep area, resumed drilling on Ellenburger contract after recovering 30 feet of oil-cut mud and 300 feet of salt water when tester was used at 4750-64 feet in Bend topped at 4747 feet, 40 feet high to a 4809-foot failure 1½ miles northwest.

Wilbarger County: British-American Oil Producing Company's Wilkinson 1, 6¼ miles northeast of Harrold pool, nearest production, has qualified as pool opener after using 1500 gallons of acid through perforations at 5780-90 feet and 5845-63 feet in Bend, or Marble Falls. Additional perforations and acid treatments are scheduled. The well flowed 64 barrels, including accumulation, of 40.7-gravity oil in 2½ hours, then after being shut in 12 hours it flowed 46 barrels in 9 hours through ¼-inch choke.

East Texas

Wood County Wildcat Reports Thick Saturation

Second test for the Oak Grove prospect in central Wood County by F. R. Jackson and Roy L. Fisher et al is being started while their McCarley 1, Hazard Anderson survey, is drilling at 5780 feet to fulfill Paluxy-test obligation after passing up unusually thick section of oil-saturated sand in Woodbine, topped at 5265 feet with elevation of 478 feet. McCarley 1 is credited with more than 200 feet of probable oil pay with the upper zone carrying 14-15-gravity asphalt crude, according to core analysis, while a porous zone at 5635-5712 feet indicated 35-gravity oil. Bert Fields and associates own half interest in the well and drilling block, which was contributed by Danciger Oil & Refineries, Inc., along with $5,000 for a Paluxy test. The partnership's second test is located in the southwest corner of the First National Bank (Quitman) tract, Jane Duncan survey, about 1½ miles east of the original test. Competition for leases in the vicinity of the prospective discovery caused prices to rise to maximum of $700 per acre, half cash and balance out of oil, for a 40-acre tract. The Oak Grove prospect is 4 miles southeast of the Cartwright one-well Paluxy area, and 4½ miles east by north of the Quitman pool, but involves a deeper seated structure.

Sohio Producing Company's Morgan 1, 2¾ miles southwest of Coke field, entered Goodland lime at 6449 feet, and was coring for Paluxy at 6460 feet. Superior Oil Company of California and Dick Andrade's Carlisle-Farris 1, 4 miles southeast of Mineola, topped Pecan Chalk at 3830 feet with elevation of 339 feet, and was drilling shale at 4845 feet.

Smackover Projects: Sun Oil Company's Rutledge 1, northeastern Kaufman County, entered Travis Peak at 6483 feet, and was drilling dry and hard sand at 6525 feet. In Hunt County, Humble Oil & Refining Company's Graham 1, west edge of Wieland pool, was drilling sandy-shale at 8285 feet in Cotton Valley with top originally called at 7250 feet then tentatively corrected to 7885 feet.

Smith County: Patrick-Tyrell Drilling Company, successor to Wickliffe et al, developed a major fishing job at 9852 feet in trying to deepen Hackett-Pure 1, Sand Flats area, to the Pettit zone. This wildcat passed up probable oil production in Paluxy at 7280-7304 feet.

Southwest Texas

Deeper Drilling Getting Results in Several Counties

The most outstanding trend development program in years for the north portion of the lower coastal belt has indications of reaching a peak this year with several good fields already opened and with operators announcing locations for more wells. The prospective territory centers in Karnes, Bee, Goliad, Live Oak, and part of Goliad County. This area never attracted much prospecting interest until late in 1942 when a wildcat opened good oil production from the Carrizo-Wilcox.

One of the most recent Wilcox strikes in Henderson Coquat's Goebel 1, three miles northeast of Oakville in Live Oak County. This well is two miles southeast of the old Oakville shallow field. The hole is bottomed at 7095 feet with the Wilcox topped at 6848 feet, and gas sand at 6980 feet. A drill-stem test at 7087-95 feet recovered 3600 feet of 34-gravity oil and 450 feet of salt water with 3300 pounds bottom hole pressure. It is completing through perforations at 7085-95 feet after erecting tanks.

Another important recent strike is Continental Oil Company's Wood 1, Wilcox discovery in the old Slick field which cored several feet of saturated oil sand and has indications of being a large discovery. Numerous wells are being planned for immediate drilling

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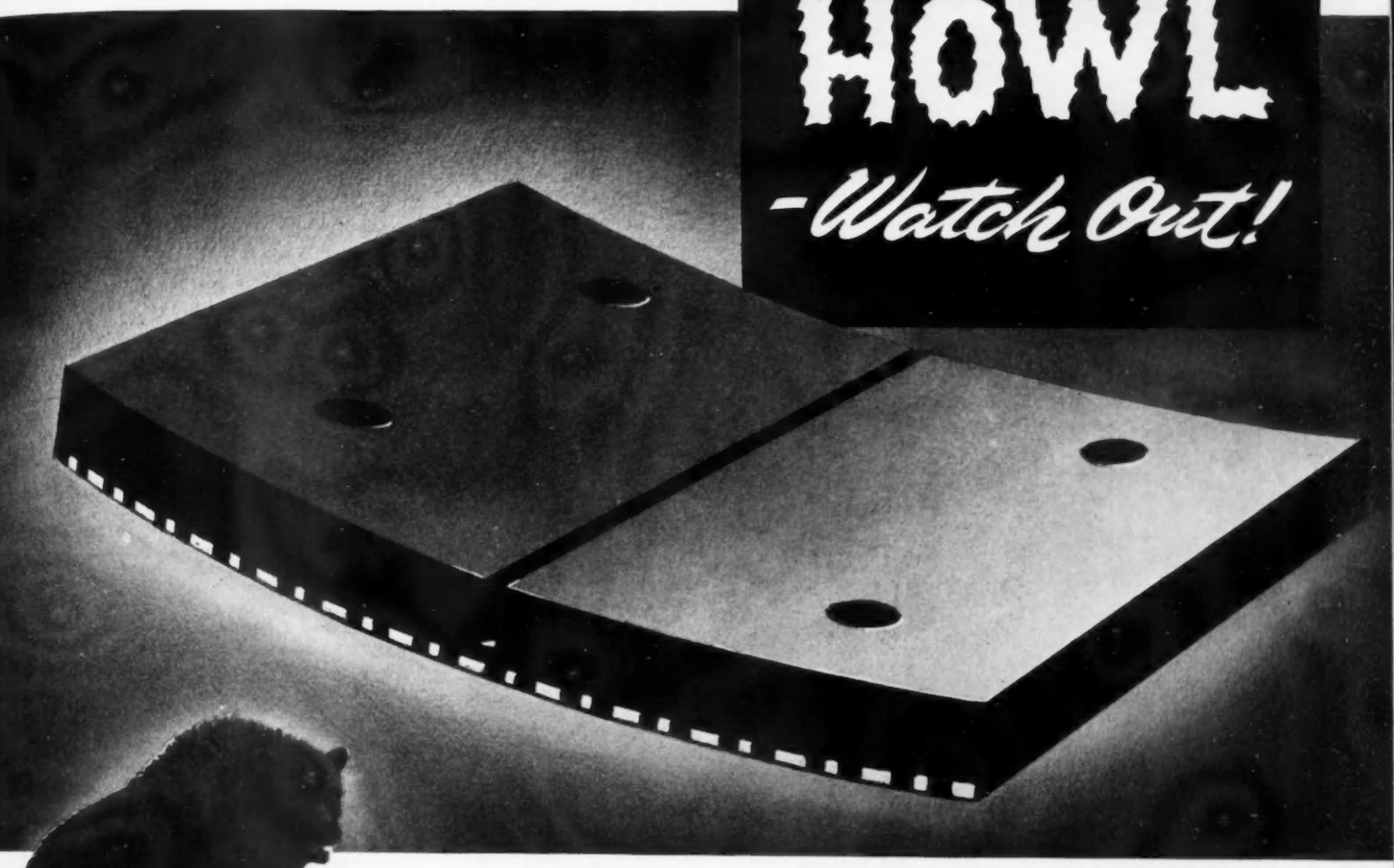

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along the Wilcox, which is comparatively unscratched from a production standpoint.

Jim Wells County: Humble Oil & Refining Company is reported to have completed potential on Evetts 1, wildcat discovery 4 miles northeast of Magnolia City field. With hole bottomed at 6156 feet and with 5½-inch casing set to 5540 feet, the well showed gas at 4137-45 feet, oil at 4278-85 feet, distillate at 5020-35 feet and another oil sand at 5260-74 feet.

Starr County: W. L. Goldson is still making flow tests in Gutierrez 1, wildcat 1 mile northwest of Barbacoas field, that is opening shallow production. Operator recovered 1000 feet of oil and a small amount of mud on 7-hour drill-stem test of perforations at 2848-62 feet, and later flowed around 22 barrels of oil daily through ¼-inch choke. Sidewall samples indicated production at 2555-70 feet and 2840-78 feet. Total depth is 4003 feet with 5½-inch casing set to 2933 feet.

Jim Hogg County: M. L. Massingill and Texon Royalty Company have set casing to make first flow test in Yeager 1, wildcat 4 miles southwest of Hebbronville. A drill-stem test at 3762-72 feet recovered 350 feet of pipe-line oil through ¼-inch choke, believed to be the O'Hearn sand. Hole is bottomed at 3772 feet and casing has been set to that depth. The well is in northeast corner of H. C. Yeager Survey 29 on a 200-acre lease.

Baton Rouge Makes First U. S. Rubber
BATON ROUGE, La., March 31. (INS)—The first crude rubber produced at the first synthetic rubber plant completed under government supervision since the Baruch committee made its report on the rubber situation was baled today.
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Texas Gulf Coast

Katy Oil Production Gets Another Extension

The Katy gas-distillate field of Waller County has received another oil extension with Kirby Petroleum Company completing Beckwith 1, 1½ miles southeast from oil production on the north flank. Although this field primarily is a gas-distillate reserve, Stanolind Oil & Gas Company opened oil production on the north side four months ago, and as a result wells are being drilled around the flanks of the structure.

Beckwith 1 was drilled to 7339 feet and cored 8 feet of oil sand at 6617 feet. Perforations were made at 6617-19 feet and flowed 208 barrels per day through 10/64-inch choke with 1000 pounds pressure on tubing and 1150 pounds on casing.

San Jacinto County: Shell Oil Company has completed a west side extension to the Mercy field with Bazzoon 2 flowing 149 barrels of 38-gravity oil daily from open hole at 8314-8322 feet from Wilcox topped at 8314 feet. The well is in Francis Reimer survey.

Brazoria County: Stanolind Oil & Gas Company will test deep producing possibilities in the Anchor area with location spotted for Holland 1, on 612-acre tract in George Robinson survey, projected to 11,000 feet.

Fort Bend County: The Clodine field is showing as a possible large producing area with several recent wells making large potentials. The latest interest in the structure is a new sand which showed oil on a drill-stem test. Stanolind Oil & Gas Company's Cinco Ranch 2 showed oil at 7037-47 feet. The regular field sand is around 7500 feet. Stanolind recently extended production on the north side and Houston Oil Company, discoverer of the area, has added a well on the north. Companies interested in the area are Stanolind, Houston, Providence Oil Company and Wynn Crosby Drilling Company.

Matagorda County: Superior Oil Company is making a new test in sand at 7554-64 feet in Peterson 1, wildcat in Sugar Valley area, after making a squeeze job at 9765-70 feet. Earlier the well showed gas and salt water in perforations at 9806-16 feet. This discovery has showed for gas-distillate production in a deeper horizon, and probably will be completed at a lower level.

South Louisiana

Terrebonne Deep Record May Be Further Cinched

One of the most interesting wells in some time is of completion in the De-Large area of Terrebonne Parish where the world's depth production record is held and where this record may be broken. The production record is held by Fohs Oil Company's Buckley-Bourg 1, which is producing distillate from the 13,266-foot horizon. Union Producing Company, in a recent trade with Fohs, took over part of the acreage and drilled Fitzpatrick-Vozard 1 in Section 77-19s-17e to 13,560 feet. It is reported that a bottom portion of this well is

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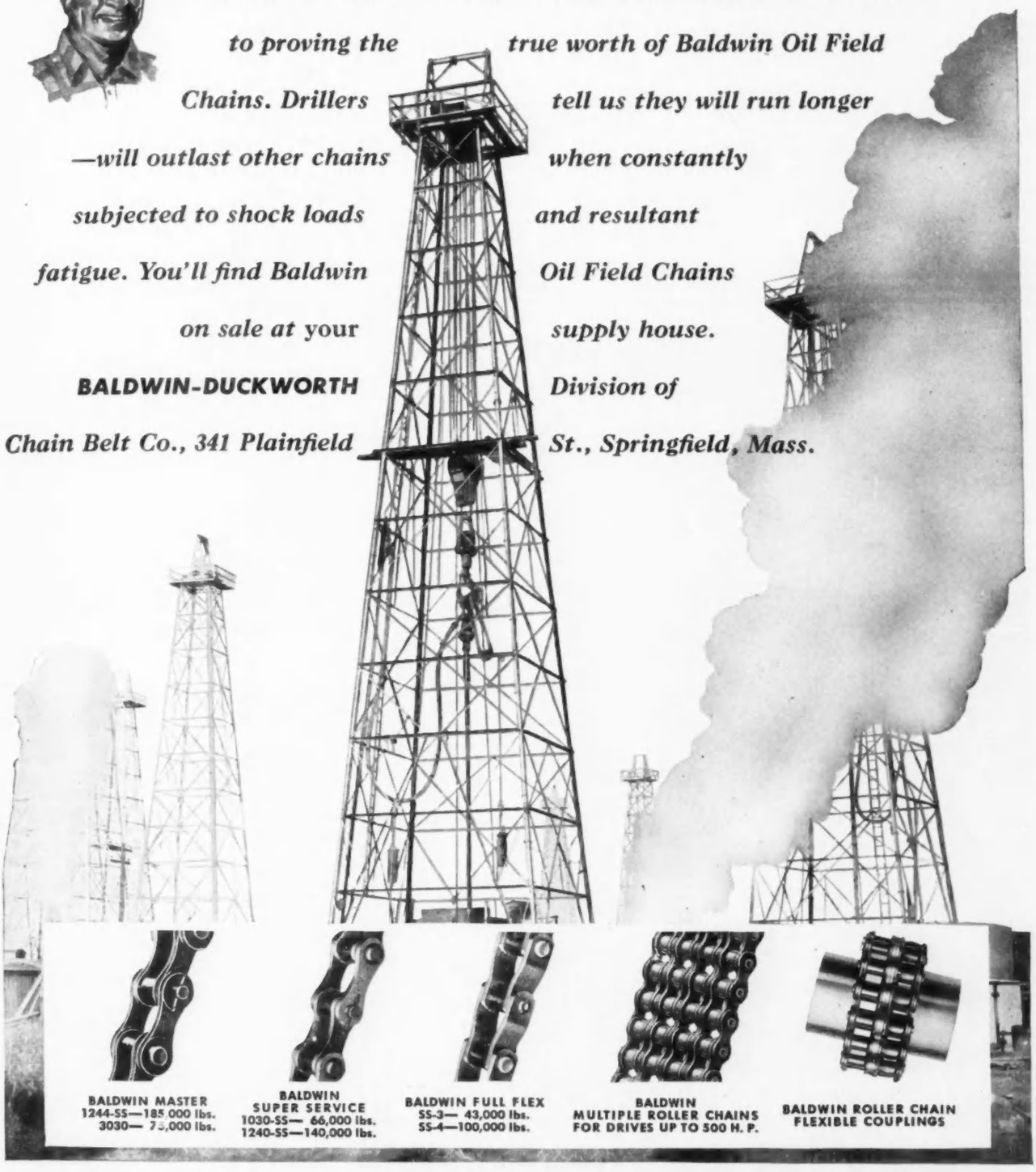

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capable of producing. If production is established at this level, a new world's record will be established for deep flowing wells.

Vermilion Parish: Humble Oil & Refining Company has completed its second well in the Pecan Island area as a dry gasser from the 7500-foot level. Louisiana Land & Fur 2, Section 27-16s-1e, is one mile northeast of the distillate discovery. It was perforated at 7538 feet and flowed 2,080,000 cubic feet of gas daily through 10/64-inch choke with 3000 pounds pressure on tubing.

St. Landry Parish: Abercrombie Company and Atlatl Royalty Company are preparing to make a new flow test in Charles-Community 1, wildcat in South Leonville area. A test was made at 9695-9713 feet which showed gas and salt water. Another test was made at 9635-50 feet, but failed to show any commercial production. The new test is being made in the 9500-foot horizon.

Beauregard Parish: Sun Oil Company is making its entrance into the Neale field and staked location for Central Coal & Coke 1. The well, projected to 11,000 feet, is on a 40-acre unit in section 29-3s-11w. Atlantic Refining Company owns most leases in this Wilcox field.

American Republics Corporation is spudding a Cockfield test in the Nolth Bancroft area of Beauregard Parish. The company recently drilled a deep Wilcox test in this area, finding some shows in the Cockfield, but later abandoning it. The new test is Lutcher-Moore 2-X, NE 34-5s-13w.

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North Louisiana

Concordia Deep Test Being Completed in Wilcox

The California Company's deep wildcat, Community 1, SW 4-9n-10e, Concordia Parish, will attempt to lower an apparent high gas-oil ratio before finalling as an upper Wilcox producer. In one hour test from perforations at 3398-3408 feet it flowed 3 barrels of 30-gravity oil, gas-oil ratio 9000/1. In early swab test at same depth it recovered oil and wash water. Test made in deep Tuscaloosa, when drilling was halted at 9000 feet, recovered 175 barrels of distillate and gas which was not gauged. It failed when it plugged back to test Wilcox at 4500 feet. Recovery was only mud and salt water at that level.

Winn Parish: Hunt Oil Company's Calvin Paluxy discovery, Goodpine F-24, SW SE 13-12n-5w, in recent workover gauged 60,000,000 feet of gas per day from new pay at 5522-30 feet. Amount of distillate flow was not given but was described as being rich. When brought in as a discovery last October, Goodpine F-24 produced from Paluxy perforations at 5784-94 feet. On initial test it flowed 317 barrels of distillate and 9,500,000 feet of gas daily. The structure is defined to the north and east. Offsets to the south and west which are now drilling will indicate soon the structure and the possibilities, in that direction.

California

Kern County Wildcat Has Encouraging Show

Showings in a wildcat which raise hopes for a discovery that could prove a considerable extension of the small but rich Republic pool in Midway-Sunset area, Kern County, and the starting of four new wildcats, three in Kern County and one in Los Angeles County, make up a summary of currently most interesting oil development news.

The Midway-Sunset venture, Chanslor Canfield Midway Oil Co.'s 79-6, SE SE SE 6-32-23, found a possible oil zone in the interval 2930-3080 feet, and casing has been run for a production test. Success with this completion would indicate a northwesterly extension of the Republic pool embracing possibly as much as 100 acres. Republic Petroleum Company, discoverer of the pool, already has started preparation for an offset on its quarter section adjoining the southeast corner of the C.C.M.O. property.

Kern County: Continental Oil Company is starting exploration of a large tract of Kern County Land Company holdings in the McClung area. Stakes were set for a first test in NW NW NE 7-30-26.

General Petroleum Corporation is grading location for Bradford 1, a Round Mountain area test, SE SE NE 15-28-28. This is a fault play, seeking shallow, low-gravity production.

The Texas Company has filed a location notice for Bowerbank III 8-6, a new wildcat for the Buttonwillow area. Former exploration in the area devel-

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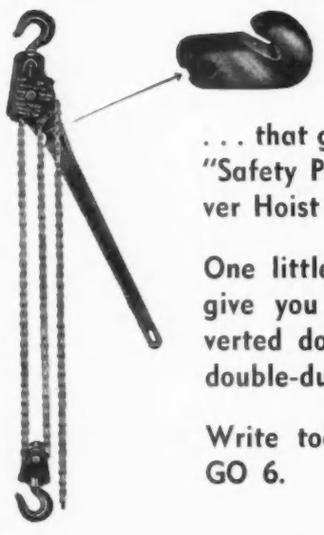

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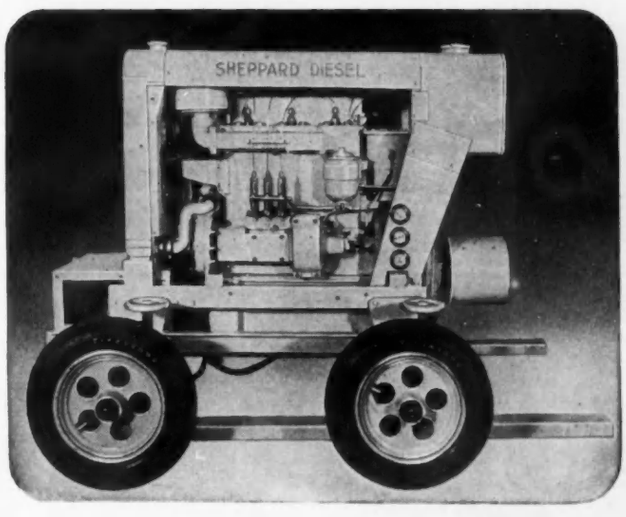

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oped non-productive oil sand showings, and position of this new location is hoped to be more favorable for finding sand of better permeability.

E. B. Hall & Company, unable to make a commercial producer out of tar sand showings in its Antelope Hills area wildcat, Theta 17-56, suspended operations. The prospective zone was found at 879-909 feet, and due to small cost of prospecting it is probable further tests will be drilled.

Los Angeles County: General Petroleum Corporation, as operator, Seaboard Oil Company, Whittier Associates and Republic Petroleum Company are associated in a venture which will test a considerable block of property on Las Lajas anticline, north of Aliso Canyon field. General Petroleum Corporation has started Mendota 1, NEc 22-3-16, on the highest part of a promising fold along the axis of the anticline.

George F. Getty, Inc., and Pacific Western Oil Corporation jointly are preparing to start a wildcat seeking an extension of the Turnbull Canyon field, southeast of production.

Michigan

Newaygo County Successes Encourage More Work

Newaygo County will come in for more intensive exploration as the result of a new gas discovery in the shallow Stray sand and completion of the second Traverse oil well in the Woodville pool. Ohio Oil Company's Pillsbury 1, S½ SE NE 29-15n-11w, Norwich Township, south offset to the discovery, flowed 362 barrels oil on first 15 hour test after 500-gallon acid treatment to Traverse pay at 2840 ft.

Three miles south of Woodville development, Taggart Brothers Company completed Goodrich G1, SE SE SW 5-14n-11w, Newaygo County, at 1180 feet in Stray sand for 10,400,000 feet gas per day for a discovery. Test checked Stray sand, a fair geological marker, flat with the oil discovery three miles north. Pure Oil Company holds bulk of acreage in the district of the gas strike with shallow gas rights farmed out to Taggarts. Discovery and other tests to be drilled will serve as sub-surface points for later deep oil development contemplated by Pure Oil Company.

Roscommon County: Gulf Refining Company's State 1, S½ SE SW 13-24n-1w, 3 miles northeast of the old Richfield oil pool, logged a show of oil and gas in Richfield at 4168 feet and will acidize at that point.

Osceola County: Union Oil Company and Atha's Allen 1, S½ SW SE 31-19n-9w, 6 miles northeast Reed City oil field, was still under test after running casing on packer at 3130 feet. This wildcat logged Traverse lime at 3131 feet and oil sand at 3157 feet. Cavings prevented immediate test.

Aetna-Prosper: C. L. Maguire, Inc.'s State A1, S½ NW SW 23-22n-6w, Missaukee County, ¾ mile north of production, will be abandoned at 3960 feet. It logged Dundee at 3955-2675 feet to show structure and it carried 800 feet of oil with water pay at 3960 feet. Probably will influence more drilling northeast of presently defined area.

Gas Program: Construction will be started immediately by West Michigan Consumers Company on a 59-mile 8-inch gas line from the Reed City field to Muskegon. Company has been awarded a permit for the line by the state Public Service Commission and WPB has approved the necessary materials.

The company will remove a gasoline plant now operated at Grand Rapids field to Reed City field. Engineers have estimated that the field, in its third year, still has a recoverable gas reserve of 10 billion feet with daily production estimated at 20 to 24 million feet. The West Michigan system will be built to handle 10 million feet per day.

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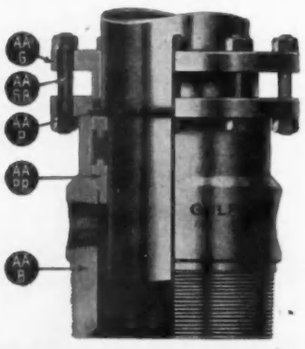

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Rocky Mountain Area

North LaBarge Deep Test Finds Gas in Frontier

Wasatch Oil Production Company's Government 1-D, SW SE SE 8-27n-113w, deep test of the North LaBarge field, Sublette County, Wyoming, encountered gas in apparently small volume, but under heavy pressure, in a thin sand section in the Frontier at 6600 feet. Drilling fluid was weighted when gas gave indications of unloading the hole, and test is coring ahead below 7000 feet feeling for additional sands expected in the Frontier series. Light oil production is developed in the Tertiary-Cretaceous contact at LaBarge, and discovery of deep light-oil production would augment supply needed for operation of 100-octane and codimer plants in Salt Lake City. The field is connected by pipe line to Salt Lake City. Wasatch Production Company is the exploration and producing affiliate of Wasatch Oil & Refining Company which operates a 2000-barrel daily plant at Salt Lake.

Horse Creek Improves: General Petroleum Corporation's 78-31-G (Government), SW SE SE 31-17n-68w, Horse Creek, Wyoming, discovery, which appeared as a major oil strike last fall, and then went to water, has been plugged back from 5530 feet to 5470 feet, reducing water content from 80 to 16 percent, and this apparently will be further reduced with continued pumping. The well made initially 580 barrels from the Lakota sand, went to 20 percent water, then to 80 percent water. Following plugging back job, well pumped 275 barrels of oil and 25 barrels of emulsion daily. The company is spudding a deep test half mile north of the discovery. Half mile south of the discovery the company recently completed a nominal pumper in the Muddy sand.

Pilot Butte: British - American Oil Producing Company's Tribal 1-D, CWL SW NW 15-3n-1w, ¼ mile north of the nearest deep production and ¾ mile northwest of the Tensleep discovery at Pilot Butte, Wyoming, which swabbed 750 barrels initial from the Tensleep at 6204 feet, 7-inch casing at 6242 feet, total depth 6349 feet, a week ago, has materially improved on further swabbing so that well flowed 107 barrels daily through casing. The well checks 50 feet higher on the Tensleep than the discovery, indicating trend of the field northwest.

White River: Frontier Refining Company is moving in rotary for Government 1, CSL NW NW 32-2n-96w, for a test into the basal Mesa Verde and possibly to the Frontier and Dakota series of the White River structure, Rio Blanco County, northwestern Colorado, and will drill to around 6500 feet. The White River structure is a broad low-closure dome with 400 feet indicated closure and embracing approximately 15,000 acres, which are unitized with Frontier Refining Company as unit operator. Surface formation at White River is the Wasatch (Tertiary). Several shallow gas wells were drilled on the structure, some of which developed upwards of 15,000,000 cubic feet daily. The Texas Company drilled one deep well, which, however, did not go to a conclusive depth, having stopped short of the lower Mesa Verde.

United States Well Completions

ARKANSAS

Nevada County—Stephens-Smart: McAlester Fuel Oil Co.'s Williams B-1, sw sw se 2-15s-20w, perf Tokio, pump 182 bbls, 2610 ft.

R. H. Crow, Tr.'s Guttry C-1, sw se sw 2-15s-20w, elev 240, perf Tokio 2513-18, pump 115 bbls, 14 hrs, 2561 ft.

Columbia County—Stephens-Smart: G. H. Vaughn's W. L. Smart 1, nw nw 14-15s-20w, perf Tokio 2528-32 ft, pump 159 bbls, td 3476 ft.

Union County—Hillsboro: Hunt Oil Co.'s Burnside 2, nw sw nw 19-18s-13w, pump 27 bbls, 3476 ft.

Arkhill et al's Burnside 1, nw ne nw 19-18s-13w, pump 27 bbls, 2492 ft.

Union County—Mt. Holly: Lion's Davis 1, ne se 10-17s-18w, perf 7148-53 ft, flow 127.2 bbls, td 7216 ft.

New London — Failure: Marine Oil Co.'s Eudy-Pagan 1, ne sw 18-18s-11w, abnd 6022 ft.

ARKANSAS WILDCATS

Calhoun County—Failure: Placid Oil Co.'s Gorth et al 1, ne sw 35-14s-15w, abnd 4711 ft.

Lafayette County—Failure: N. Hobson Wheless' Coleman 1, sw ne 30-16s-24w, abnd 5216 feet.

Union County—Failure: Curtis Kinard et al's Teal 1, se nw sw 11-19s-12w, abnd 3183 ft.

CALIFORNIA

Fresno County—Coalinga, old field: Standard's 24-35A, se ne se 35-19-15, pump 150 bbls, perf 3368-3473, 3488-3500 ft, td 3505 ft.

Standard's 19-35A, se sw se 35-19-15, pump 105 bbls 27.4-gr, perf 3279-3399, 3501-3621 ft, td 3642 ft.

Fresno County — Riverdale: Amerada's Young 2-15, sw nw nw 15-17-19, flow 246 bbls 36.5-gr, 8/64-in, 1100/800 lbs, 200,000 gas, perf 6785-6800 ft, td 6870 ft.

Kern County—Belridge, South: Belridge Oil Co.'s 58-34, sw sw se 34-28-21, pump 35 bbls 13.5-gr oil, 15 water, perf 479-790 ft, td 790 ft.

Belridge Oil Co.'s 68-34, ne sw se 34-28-21, pump 22 bbls 13.7-gr oil, 23 water, perf 469-781 ft, td 781 ft.

Chanslor Canfield Midway Oil Co.'s B.F. 11-3, nw nw sw 11-29-21, pump 13 bbls 15-gr, 32 ft perf 1160 ft, td 2463 ft, pd 1160 ft.

General Petroleum Corp.'s 11-1, ne sw sw 1-29-21, pump 32 bbls 14-gr, perf 792-820, 860-996 ft, td 997 ft.

General Petroleum Corp.'s 89-2, nw ne se 2-29-21, pump 57 bbls 11.6-gr, perf 567-657, 753-856, 886-926 ft, td 1250 ft, pd 928 ft.

Texas Co.'s Wrightson Fee 5, sw nw sw 12-29-21, pump 5 bbls, perf 946-598 ft, td 1085 ft, pd 960 ft.

Kern County—Buena Vista Hills: Standard's 87-11D, sw ne nw 11-32-24, pump 35 bbls, 66 ft perf 2795 ft, td 2798 ft.

Union's McLeod 17, se se ne 34-31-23, pump 11 bbls oil, 22 water, perfs 2912-2952, 3164-3300, 3483-3514, 3538-3583 ft, gusher sand 3160 ft, td 3602 ft.

Kern County — Elks Hills: U. S. Navy's 76-2G, 2-31-24, pump 136 bbls 22.2-gr, 501 ft perf 3030 ft, 3138 ft, pd 3032 ft.

U. S. Navy's 47-27S, ne se sw 27-30-24, pump 552 bbls 15.2-gr, perfs 3260-3223, 3305-3290 ft, td 3314 ft.

Kern County—Fruitvale: Western Gulf's Red Ribbon 18, ne se sw 27-30-24, pump 131 bbls 16.2-gr, perf 4230-4270, 4180-4190, 4050-4120, 4010-4030, 3550-3960, 3860-3930, 3795-3825, 3700-3730 ft, td 4360 ft.

Kern County — Midway - Sunset: Chanslor Canfield Midway Oil Co.'s McGregor 1, nw sw se 27-31-22, brown shale 3080 ft, abnd 3590 ft.

Chanslor Canfield Midway Oil Co.'s 54-9, ne se sw 9-23-32, pump 54 bbls, 64 ft perf 1661 ft, td 1670 ft.

Honolulu Oil Corp.'s E & M 8A, sw sw sw 10-31-22, pump 9 bbls 12.5-gr, perf 393-561 ft, td 923 ft, pd 582 ft.

Otis Hoyt's Maricopa 11, nw se nw 7-11-23, pump 73 bbls 12.8-gr, perf 1670-1824 ft, td 1824 ft.

Richfield's Fairfield 9, nw se ne 11-31-22, pump 142 bbls 18-gr, 50 ft perf 1229 ft, oil zone 1185 ft, td 1301 ft, pd 1230 ft.

Standard's 67-31E, se nw ne 31-12-23, flow 240 bbls 25-gr, 36/64-in, 70/? lbs, 25,000 gas, 30 ft perf 2655 ft, td 2671 ft.

Standard's 109-31E, ne sw ne 31-12-23, pump 10 bbls, perf 1868-1890 ft, td 2012 ft, pd 1890 ft.

Kern County—Poso Creek-Premier: Standard's 5-26, nw sw ne 5-28-27, pump 145 bbls 12.4-gr, 184 ft perf 2848 ft, td 2850 ft.

Standard's 12-8, nw nw ne 8-28-27, pump 9 bbls 11.8-gr oil, 41 water, 134 ft perf 2837 ft, td 2900 ft, pd 2839 ft.

Kern County — Round Mountain: Honolulu Oil Corp.'s 73, sw se ne 20-28-29, pump 6 bbls 29.2-gr oil, 9 bbls water, perf 1503-1589, 1698-1959 ft, td 1960 ft.

Los Angeles County—Oak Canyon: Western Gulf's Gilmour 1, sw sw ne 32-5-17, abnd 7675 ft.

Los Angeles County—Turnbull Canyon: Continental's Turnbull Comm. 5, 1470 nly along c/l La Cuesta Ave. fr c/l La Subida Drive thence 796 wly at r/a, pump 87 bbls 25.9-gr, td 3630 ft, pd 3480 ft.

Los Angeles County—Torrance: Texas Co.'s Oakley, 11,536 ft ely along c/l Lomita Blvd. fr c/l Dodge Ave. thence 635 ft sly at r/a, pump 75 bbls, 121 ft perf 3651 ft, td 3685 ft.

Orange County—Huntington Beach: Standard's Huntinton A-48, 2250 ft nwly along c/l Wesley Ave. fr c/l 23rd St. thence 250 ft swly at r/a, pump 244 bbls 16.1-gr, td 3550 ft.

Santa Barbara County—Cat Canyon: O. C. Field's Williams 1, nw se nw 32-9-32, Sisquoc 1040 ft, Santa Margarita 2115 ft, Monterey 2892 ft, abnd 3940 ft.

Santa Barbara County—Santa Maria Valley: Bel-Air Oil Co.'s Twitchell Weging Comm. 1, nw ne nw 35-10-34, pump 500 bbls 16-gr, 523 ft perf 5420 ft, Miocene 5045 ft, td 5420 ft.

Union's Union Sugar 16, 4403 ft sly 990 ft wly fr nec Union Sugar ppty, pump 21 bbls 12.8-gr oil, 10 water, 159 ft perf 5596 ft, oil sand 5485 ft, Pliocene-Miocene contact 5143 ft, td 5600 ft, pd 5596 ft.

Union's Union Sugar 17, 1733 ft sly fr nec ppty thence 1646 wly at r/a, pump 136 bbls 16.5-gr, 144 ft perf 4668 ft, Franciscan 4657 ft, td 4670 ft.

Ventura County—Ventura Ave.: Shell's Taylor 161, 281 ft n 4828 ft w c c/l No. 11, flow 1023 bbls 30.9-gr, 40-16/64-in, 1300/1350 lbs, 852,000 gas, perf 8737-3410, 8371-8012 ft, td 8744 ft.

CALIFORNIA WILDCATS

Fresno County—Extension: Robert S. Lytle's 88-20F, se se se 20-20-16, northerly extension Guijarral Hills pay, flow 1085 bbls 28.5-gr, 21/64-in, 1015/850 lbs, 731,000 gas, perf 8808-8860, 8887-9052 ft, Temblor 5940 ft, Kreyenhagen 7260 ft, sand 8810-9038 ft, td 9052 ft.

Fresno County—Failure: Standard's Pleasant Valley 62-29F, se nw ne 29-20-16, unsuccessful attempt at westerly extension Guijarral Hills pay, Eocene sand 8500 ft, abnd 9055 ft.

Kern County—Failure: Signal Oil & Gas Co.'s McGregor 1, nw nw ne 26-28-28, Round Mountain area, Vedder 2895 ft, lower Vedder 3152 ft, abnd 3162 ft.

Kings County—Failure: Tide Water Associated's Orchard 56-1, sw nw se 30-24-18, McLure Valley area, Eocene sand 2117 ft, abnd 3039 ft.

COLORADO

Rio Blanco County—Rangely: Raven Oil & Refining Co.'s Fee 40, ne nw ne 31-2n-102w, abnd 1515 ft.

ILLINOIS

Clay County: W. C. McBride's Dehart 2, se ne se 9-3n-7e, abnd 3060 ft.

H. Luttrell et al's Reed 11, ne sw nw 14-5n-5e, abnd 1756 ft.

Franklin County: H. J. Schafly's Smith 3, se sw ne 23-6s-2e, Tar Spgs 2086-95 ft, 16 bbls, 2095 ft.

Hamilton County: Oil Carrier, Inc.'s O. Irvin 1, se nw ne 35-6s-6e, Aux V 3087-3103 ft, 157 bbls, 3107 ft.

Jefferson County: Mohawk Drilling Co.'s Esmon 1, nw nw 26-3s-4e, abnd 3108 ft.

Mohawk Drlg. Co.'s Hopkins - Epperson Comm 1, sw ne 27-3s-4e, abnd 3109 ft.

Marion County: Texas Co.'s Snyder 6, ne sw ne 16-1n-2e, Bethel 1905-1924 ft, 171 bbls, 1924 ft.

Montgomery County: W. R. Holmes' Keune 1, nw ne nw 32-8n-5w, abnd 689 ft.

Richland County: Southwestern O&G Co.'s Boatman Comm 1, ne ne nw 34-4n-10e, McCl lm 3077-82 ft, 117 bbls, 3082 ft.

Wayne County: C. R. Ross and Deep Rock's Gregory-Morris Comm 1, se se sw 18-1s-5e, abnd 3070 ft.

Carter's Goff 2, sw nw nw 17-1s-6e, Aux V sd 3038-50 ft, 101 bbls, 3051 ft.

Pure's Elmer Barnard 3, sw se nw 17-1s-6e, abnd 3260 ft.

Deep Rock's Stroup 2, se sw 29-1s-7e, L. O'Hara 3170-80 ft, 83 bbls, 3180 ft.

Pure's Fossan A-1, ne sw 14-1n-8e, McCl lm 3080-85 ft and 3069-75 ft, 74 bbls, 3085 ft.

White County: Magnolia's Roser 2, sw ne ne 25-5s-10e, Paint Creek sand 2827-40 ft, 75 bbls, 2843 ft.

ILLINOIS WELLS DEEPENED

Wabash County: Continental's Schultz A-3, se se se 8-2s-13w, otd 2427 ft, Ben sand 2541-84 ft, 18 bbls, 2584 ft.

ILLINOIS WILDCATS

Greene County—Failure: D. S. Brooks' Valley Farms 2, c nw se 30-11n-13w, abnd 765 ft.

Hamilton County—Failure: Wiser Oil Co.'s W. C. Echols 1, n½ nw se 33-4s-6e, abnd 3505 ft.

Lawrence County—Failure: DeKalb Agric Assn.'s King 1, se ne se 8-2n-12w, abnd 1610 ft.

Marion County—Failure: Big Chief Drlg. Co.'s Hanes 1, se sw se 22-1n-2e, abnd 2300 ft.

Shelby County—Failure: Continental's Russell 1, sw se se 21-11n-2e, abnd 1837 ft.

St. Clair County—Failure: N. W. Whitton's Grossman 1, ne sw se 24-1s-9w, abnd 1505 ft.

Washington County—Failure: A. W. Gerson's Casten 1, se nw sw 9-1s-1w, abnd 1562 ft.

Wayne County — Failure: H. H. Weinert's Thomas-Long 1, sw se 26-1s-7e, abnd 3390 ft.

White County—Discovery: Sun Oil Co.'s E. T. Lutz 1, se sw nw 30-4s-14w, McCl lm 3035-39 and 3054-84 ft, 68 bbls, 3108 ft.

INDIANA

Daviess County: J. W. Cannon's Beck 2, se sw ne 8-2n-5w, abnd 652 ft.

Jay County: Grisell & Kwis' Ankron 1, nw nw nw 23-23n-13e, pay 1030-35 ft, 5 bbls, 1060 ft.

Harold Hanlin's Gladys 3, near c s½ sw 24-24n-12e, abnd 1069 ft.

Posey County: Yingling Bros.' Dickhaut 1, nw se ne 19-6s-12w, Cypr 2340-56 ft, 24 bbls, 2356 ft.

Central States Oil Co.'s Hermson 5, s½ se nw 30-6s-12w, Walt 1880-1915 ft, 60 bbls, 1915 ft.

INDIANA WILDCATS

Jennings County — Failure: Ohio Valley O&G Co.'s Waltermeyer 1, nw ne ne 12-7n-7e, abnd 1200 ft.

Vanderburg County—Failure: G. E. Nelson's Zimmerman 1, se sw se 22-7s-11w, abnd 2566 ft.

KANSAS

Barber County—Whelan area: Olson Oil Co.'s Swartz 1, c sw ne 6-32s-11w, Miss 4260 ft, abnd 4312 ft.

Barton County—Kraft-Prusa: Sinclair Prairie's Schmidt 5, ne nw nw 20-16s-11w, Lans 3029 ft, 4000 gals acid, pump 498 bbls, 3425 ft.

Magnolia's Grossardt 3, c se sw 9-17s-11w, Arb 3268 ft, swab 30 bbls hr, 3273 ft.

Cities Service's Hogan A-5, ne nw ne 11-17s-11w, Arb 3372 ft, pump 455 bbls, 3393 ft.

Barton County — Beaver: Darby Oil Co.'s Staubinger 1, c s½ se nw 8-16s-12w, quartzite 3344 ft, abnd 3349 ft.

Barton County—Silica: C. E. Ash's Schartz A-3, c e½ senw 7-20s-11w, Arb 3324 ft, 8000 gals acid, pump 300 bbls oil, 300 wtr, 3335 ft.

Butler County — Eldorado: C. S. Dustin's Robinson 2, c s½ se sw 17-25s-5e, Miss 2495 ft, pump 25 bbls, 2550 ft.

Butler County — Haverhill: Cromwel and Lewis' Reetz 7 Skaer 1, nw sw sw 35-27s-5e, Viola 3097 ft, 1000 gals acid, pump 25 bbls, 3101 ft.

Ellsworth County—W. Stoltenberg: N. Appleman's Harbacek 1, c e½ sw ne 7-16s-10w, Arb 3299 ft, 1500 gals acid, pump 123 bbls, 3322 ft.

Ellsworth County—Stoltenberg: McCullough & Dawson's Horejsi 1, c nw ne 17-6s-10w, Arb 3357 ft, 500 gals acid, pump 15 bbls hr, 3365 ft.

Leavenworth County — McLouth: Charles Miller's Tullis 1, sw sw se 22-9s-20e, Miss 1382 ft, 2000 gals acid, abnd 1421 ft.

Marion County — Lost Springs: Larieux & Harrington's Honska 3, c sw ne 5-18s-4e, Miss 2398 ft, pump 225 bbls in 21 hrs, 2426 ft.

McPherson County — Crowthers: Westgate-Greenland's Crowthers A-1, c nw ne 26-17s-1w, Miss 2803 ft, 2000 gals acid, pump 128 bbls, 2828 ft.

Pratt County—Carmi: Magnolia's Binger 2, sw ne ne 21-26s-12w, Arb 4288 ft, 3000 gals acid, flow 22 bbls hr, 4314 ft.

Pratt County — Cunningham - Cairo: Deep Rock's Bowers 1, c e½ se se 34-27s-11w, Lans 3486 ft, 4000 gals acid, pump and flow 471 bbls, 4132 ft.

Reno County—Peace Creek: Cities Service's Morgan 1, sw nw sw 6-23s-9w, Viola 3720 ft, 500 gals acid, pump 90 bbls, 3749 ft.

Reno County—Peace Creek Area: Magnolia's Johnson 1, sw ne sw 32-23s-10w, Chert 3668 ft, 4000 gals acid, flow 130 bbls, 3715 ft.

Reno County—Zenith: Skelly's Johnson 1, c se sw 31-23s-10w, Viola 3684 ft, flow 174 bbls, 3725 ft.

Rice County—Orth: Transwestern et al's Zink 1, c ne sw 22-18s-10w, Arb 3257 ft, abnd 3300 ft.

Rice County—Silica: Shasta Oil Co.'s Flora 1, se se sw 26-19s-10w, Arb 3309 ft, abnd 3323 ft.

Russell County—NW Greenvale: Jones & Shelbourne's Hupfer 2, se ne nw 31-14s-12w, Gorham 3111 ft, pot 851 bbls, 3117 ft.

Russell County—Witt: Coralena Oil Co.'s Krug 2, sw ne se 4-14s-14w, Lans 2976 ft, 2000 gals acid, pump 1077 bbls, 3003 ft.

Stanolind's Boxberger 1, sw nw nw 10-14s-14w, Lans 2979 ft, 9000 gals acid, pump 585 bbls, 3241 ft.

Stanolind's Boxberger 2, sw ne nw 10-14s-14w, Lans 2988 ft, 6000 gals acid, swab 78 bbls 3 hrs, 3253 ft.

Russell County — Trapp: Cities Service's Krug A-6, sw sw ne 24-15s-14w, Arb 3347 ft, 500 gals acid, pot 1007 bbls, 3352 ft.

Stafford County—Drach: Stanolind's Harms B-4, c nw nw 18-22s-12w, Arb 3686 ft, 5500 gals acid, pump 369 bbls, 3691 ft.

Stanolind's Harms 5, c n½ ne ne 18-22s-

12w, Arb 3681 ft, 500 gals acid, swab 12 bbls hr, 3687 ft.

KANSAS WILDCAT COMPLETIONS

Barber County—New Pool: Aladdin's National Gypsum Co. 1, sw nw se 20-30s-15w, congl 4435-51 ft, 1000 gals acid, pump 129 bbls, 4451 ft.

Barton County — Discovery: Vernon O&G Co.'s Barrett 1, se ne se 36-16s-14w, Arb 3434-65 ft, 500 gals acid, pump 14 bbls, 3465 ft.

Barton County — Failure: Transwestern's Evans 1, c se sw 35-17s-11w, Topeka 2658 ft, Arn 3366 ft, abnd 3400 ft.

Ellsworth County—Discovery: I. W. Murfin's Loula 1, c s½ sw se 28-16s-10w, Lans 2990-3000 ft, pot flow 196 bbls, 3010 ft.

Rice County — Failure: Mid - Plains and Zephyr Drlg.'s Sangster 1, c e½ se nw 13-19s-8w, Viola 3438 ft, Arb 3529 ft, abnd 3562 ft.

Rooks County—Failure: Sinclair's Mathews 1, sw ne se 28-6s-20w, gran wash 3771 ft, abnd 3800 ft.

Russell County—Failure: H. Gore's Parker 1, se se sw 7-15s-12w, Arb 3274 ft, abnd 3295 ft.

Sedgwick County—Failure: Lion's Creasser 1, nw sw sw 14-25s-2w, Arb 4007 ft, abnd 4095 ft.

Stafford County—Failure: J. H. Hershey's Ahnert 1, c n½ nw ne 3-23s-13w, Arb 3895 ft, abnd 3925 ft.

KENTUCKY

Daviess County: Sohio's Weathington 1, 10-N-27, lcn.

Robert Reilly's Prudential Life Ins. Co. 1, 4-P-27, dr.

Henderson County: Coaster Oil Co.'s Kloke 1, 9-P-22, dr.

W. F. Lacey's Sherril 1, 9-Q-22, dr.

W. F. Lacey's Cooper 1, 16-Q-22, lcn.

Kingwood Oil Co.'s Rash 1, 22-Q-24, lcn.

Hopkins County: H. C. Dieterich's Gooch 1, 15-K-23, dr.

Logan County: Charles Berger's Brown 2, 21-G-31, dr.

Union County: Pure's Mason A-1, 6-O-19, lcn.

KENTUCKY WILDCATS

Logan County — Failure: Charles Berger's Brown 1, 21-G-31, abnd 700 ft.

Union County—Failure: Kingwood Oil Co.'s Patberg 1, 11-O-21, abnd 2712 ft.

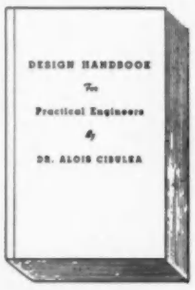
NORTH LOUISIANA

LaSalle Parish—Little Creek: R. O. Roshko's Russell 1, ne 36-9n-1e, abnd, 2501 ft.

DESIGN HANDBOOK for Practical Engineers

By DR. ALOIS CIBULKA

Department of Petroleum Engineering University of Texas Austin, Texas



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Union Parish—Monroe: J. E. Farrell Co.'s Union 9, 37-20n-3e, 3,469,000 gas.

NORTH LOUISIANA WILDCATS

Caddo Parish—Failure: H. C. Owens et al's Dominick 1, ne se 7-22n-14w, abnd 6010 ft.

Grant Parish—Failure: Sohio Oil Co.'s Colfax 1, nw nw 22-8n-3w, abnd 4729 ft.

Red River Parish — Failure: Cryer and Reese's Bramburg 1, se ne 27-12n-9w, abnd 1775 ft.

West Carroll Parish—Failure: Continental's Bruce 3, nec 2-20n-9e, abnd 2698 ft.

SOUTH LOUISIANA

Acadia Parish—Tepetate: Falcon-Seaboard and Vincent & Walsh's Miller 1-B, 2681 ft e, 805 ft n sw c 28-7s-2w, 5½-in 9337 ft, abnd 9337 ft.

Plaquemines Parish—Garden Island: Texas Co.'s 61, s 58 deg 8309 ft fr USCGS Mon "Minnesota" in 108-23s-32e, abnd 4317 ft.

St. James Parish—Hester: Humble's Colonial Sugars 1, fr ne cor sec 5, go s'ly on el 3062 ft, thence w'ly at ra 660 ft in 5-12s-5e, perf 5342-45 ft, flow 92 bbls 9/64-in, td 7692 ft.

Vermilion Parish—West Gueydan: Magnolia's Reese 2-B, 466 ft n&e sw c e½ ne 5-12s-2w, 5½-in 10,799 ft, perf 10,790-93 ft, flow 140 bbls, ⅛-in, td 10,869 ft.

SOUTH LOUISIANA WILDCAT

Acadia Parish—Discovery: Sun's Daily 1, discovery of Egan field, 1980 ft w, 660 ft n se c 164-ac tr in swc 31-9s-1w, 8 mi w Crowley, 7-in 10,871 ft, perf 10,610-25 ft, flow 105 bbls 50-gr, 3,550,000 gas, 3/16-in, td 11,199 ft.

MICHIGAN

Clare County—North Winterfield: Taggart Brothers Co.'s State 3, c sw 6-20n-6w, 4,520,-000 gas, 1326 ft.

Mecosta County—Fork: Gulf's Climer-State 1, c nw ne 7-16n-7w, Dundee lime, swab and flow 138 bbls 8½ hrs, td 3853½ ft.

Missaukee County—Aetna-Prosper: C. L. Maguire's State A1, s½ nw sw 23-22n-6w, abnd 3960 ft.

Cities Service's Apps 1, c s½ sw ne 26-22n-6w, Dundee lime, flow 56 bbls 2 hrs, 3845½ ft.

Montcalm County — Six Lakes: Leslie T. Barber's Cornell 2, ne nw sw 16-12n-7w, abnd 1484 ft.

Newaygo County — Woodville — Norwich: Ohio's Pillsbury 1, s½ se ne 29-15n-11w, Traverse lime, acidized 500 gals, flow 362 bbls in 15 hrs, perf 2840-44 ft, td 2864 ft.

Osceola County—Cedar: Sun's Beardsley 1, s½ nw sw 27-18n-9w, Traverse 3186-3210 ft, Dundee 3784-97 ft, abnd 3797 ft.

Osceola County—Evart: Sun's Decker 2, n½ se nw 28-18n-8w, Dundee lime, flow 259 bbls 14 hrs, 3766 ft.

Ottawa County—New Holland: Borough & Sander's Van Sloten 1, ne nw nw 36-5n-15w, abnd 1492 ft.

MICHIGAN WILDCATS

Newaygo County—Gas Discovery: Taggart Brothers Co.'s State G1, se se sw 5-14n-11w, elev 1080 ft, Stray 1168 ft, 10,400,000 gas, 1180 ft.

Osceola County — Failure: C. J. Smith's Johnson 1, n½ ne nw 2-17n-10w, Monroe 3760 ft, abnd 3790 ft.

Roscommon County—Failure: Freeman Oil Co.'s State D1, n½ ne nw 14-21n-3w, abnd 1600 ft.

MICHIGAN NEW HORIZON

Osceola County—Cedar: Ohio's Boettcher 2, s½ sw se 28-18n-9w, elev 1286 ft, Traverse lime 3317 ft, pay 3350-3400 ft, pump and swab 41 bbls after acid, otd 3975 ft.

MONTANA

Glacier County—Cut Bank: A. B. Cobb & Co. and Wm. Hanlon's Tribal-224 1, se se se 13-32n-6w, swab 90 bbls, Lower Cut Bank 2950-63 ft, 1-in 2900 ft, td 2989 ft.

Frances Oil Co.'s Ward 1, se sw sw 32-36n-65w, Sunburst 2950-65, Cut Bank 2984-3045 ft, 7-in 3002 ft, abnd 3060 ft.

Santa Rita Oil & Gas Co.'s Weaver 1, se ne nw 27-35n-6w, swab 88 bbls, Lower Cut Bank 2955-75 ft, shot 40 qts, td 2980 ft.

Trigood Oil Co.'s Tribal-229 1-X, se ne se 25-32n-6w, swab 340 bbls, elev 3701 ft, 7-in 3011 ft, Lower Cut Bank 3037-52 ft, td 3053 ft.

Trigood's Tribal-230 3, se ne sw 29-32n-5w, Upper Cut Bank 2843-50 ft, abnd 2880 ft.

Toole County—Kevin-Sunburst: A. E. Crumley & Son's Fryberger 26, nw sw se 24-35n-3w, pump 2 bbls oil, 10 water, Ellis-Madison contact 1562-90 ft, 500 gals and 1000 gals acid, pb 1590 ft, td 1610 ft.

Mills Oil Co.'s Govt. 4-A, ne ne se 8-35n-2w, Ellis - Madison contact 1610-18, abnd 1664 ft.

Nepstead, Montgomery & Frager's Haugen 5, ne sw se 2-35n-2w, pump 15 bbls, Ellis-Madison 1846-66 ft, td 1846 ft.

Pfabe & Engleking's Hurley 4, nw ne nw 8-34n-2w, pump 6 bbls, Ellis-Madison 1450-55 ft, 1000 gals acid, td 1445 ft.

Prevol & Shay's Waite 13, nw nw ne 13-35n-2w, pump 20 bbls, Ellis-Madison 1523-27 ft, acidized 500 gals, td 1546 ft.

O. E. Reickoff's Bannister 1, sw se sw 35-37n-3w, lost hole and skidding rig for 1-X, td 910 ft.

Texas Co.'s Bruins 11, nw se ne 10-35n-2w, pump 188 bbls, Ellis-Madison 1650-53 ft, acid 500 gals, td 1665 ft.

Texas' Bruins 17, sw sw sw 15-35n-2w, pump 6 bbls, 1595 ft.

Texas' Howling 8, sw ne sw 10-35n-2w, pump 51 bbls, Ellis-Madison 1619 ft, acid 500 gals, td 1628 ft.

NEW MEXICO

Eddy County: W. S. Randall-Barney Cockburn's Etz 5, c ne sw 26-16s-30e, flow 80 bbls, 2-in, shot 140 qts 3170-3214 ft.

Lea County—Eunice: T.P. Coal & Oil Co.'s State 28-A, c ne se 5-22s-36e, flow 432 bbls, 20/64-in, acid 2000 gals 3850-85 ft.

Lea County—South Lovington: Stanolind's State 9-E, c sw ne 2-17s-36e, flow 48 bbls, 40/64-in, acid 4500 gals 4695-5147 ft.

Lea County—Rhodes: Anderson-Prichard's Morris-Gregory 2-B, c n½ nw sw 27-26s-37e, flow 51 bbls, 2-in, shot 100 qts 3275-3327 ft.

Lea County—Maljamar: Johnny Cockburn et al's Miller 12-B, c se se 25-17s-32e, flow 100 bbls, 2-in, 40-85-4237 ft, td, 4300 ft.

Johnny Cockburn et al's Miller 13-B, c sw nw 30-17s-30e, flow 540 bbls, 2-in, 4230-70 ft.

Johnny Cockburn et al's Miller 14-B, c ne sw 25-17s-32e, flow 250 bbls 2-in, shot 220 qts 4110-4210 ft.

Maljamar O&G Corp.'s Mitchell 16-A, c nw nw 20-17s-32e, flow 200 bbls, 2-in, shot 90 qts 3986-4020 ft, td 4023 ft.

OKLAHOMA

Comanche County—Fort Sill: Texas Co.'s Roll 2, c nw sw 5-3n-10w, Pontotoc 950 ft, abnd 1069 ft.

Creek County—Glenn: Gulf's Barnes 22, sw sw sw 8-17n-12e, input well, 1703 ft.

Sinclair Prairie's Berryhill 48, sw ne ne 16-17n-12e, input well, 1600 ft.

Garfield County—N. Lucien: G. P. Dickey's Worden 2, c sw sw 25-21n-3w, Marshall 5524, abnd 5555 ft.

Garfield County—Garber: Sinclair Prairie's Campbell 25, ne se nw 30-22n-3w, 2nd Hotson 1493-91 ft, pump 23 bbls, 1505 ft.

Garfield County—Enid: Champlin Rfg. Co.'s Kunkel 2, c n½ sw nw 23-23n-6w, Miss 6092 ft, 13,000 gals acid, flow 26 bbls, 6198 ft.

Logan County—Crescent: Sunray's Wells 2, sw nw nw 26-17n-4w, Layton 4961 ft, flow 324 bbls in 12 hrs, 4986 ft.

Okfuskee County—Weleetka: R. Viersen's T. Barnett 3, ne sw ne 4-10n-11e, abnd 2909 ft.

Oklahoma County—Edmond: Harper & Turner's Wilson 2, c ne ne 18-14n-2w, Bartls 5887 ft, flow 40 bbls, 5911 ft.

Osage County—Skiatook: Link's Osage 10, c se nw 4-22n-12e, Bartles 1491 ft, shot 25 qts, pump 8 bbls, 1753 ft.

Seminole County — Konawa: P. Traugh's Griffin 1-A, c nw sw 17-6n-6e, Cromwell 2873 ft, abnd 2926 ft.

Stephens County — Velma: Carl Carter's Brown 19, c n½ 26-1s-5w, abnd 760 ft.

L. W. Winkler et al's Edwards 1, se nw nw 6-2s-4w, shot 10 qts, pump 1½ bbls in 12 hrs, 2502 ft.

OKLAHOMA WELLS DEEPENED

Creek County—E. Stroud: Summitt's Fisher 4, se nw se 32-15n-7e, otd 2875 ft, 100,000 gas, 3301 ft.

Creek County — Glenn: Sinclair Prairie's Berryhill 3, sw nw nw 16-17n-12e, otd 1520 ft, Glenn production 1520-70 ft, shot 50 qts, pump 8 bbls, 1571 ft.

Garvin County—Pauls Valley: Mid-Continent's Campbell 1, se se ne 36-4n-1w, otd 4014 ft, 1st bromide 4005-32 ft, flow 2007 bbls, 4032 ft.

Seminole County — Fish: Winona et al's Meyers 4, nw sw ne 31-7n-8e, otd 4212 ft, Wx 4228-33 ft, pump 13 bbls, 4352 ft.

Seminole County — S. Cromwell: Sinclair Prairie's Miles 1, ne ne se 29-10n-8e, otd 4202 ft, 10,500,000 gas, 4303 ft.

OKLAHOMA WILDCATS

Carter County — Failure: Northern Ordnance's Fish 1, nw nw ne 10-1s-2w, abnd 1032 ft.

Cleveland County—Failure: H. L. Berkey et al's Shultz 1, c ne ne 5-10n-1w, 2nd Wx 6929 ft, abnd 6929 ft.

Muskogee County—Failure: F. R. Jackson's Blackstone 1, nw sw nw 30-12n-20e, Arb 1390 ft, abnd 1447 ft.

Noble County—Failure: Ohio et al's Zimmerman 1, ne se nw abnd 4555 ft.

Pittsburg County — Failure: Phillips' Parsons 1, nw nw se 24-8n-16e, Fayetteville 6070 ft, abnd 6292 ft.

EAST TEXAS DISPOSAL WELL

Gregg County—(Kilgore): East Texas Salt Water Disposal Co.'s Payne-Benson 2, 145 ft ewl and 150 ft nsl 97.36-ac tr, W. P. Chism sur, elev 364 ft, top Woodbine 3688 ft, td 3775 ft.

EAST TEXAS WILDCATS

Hunt County—Oil Discovery: Stanolind's Tilson 1, 330 ft out nwc 112-ac tr, or 2900 ft ewl and 910 ft from m/n/s lines Chas. C. Dale sur, 1¾ mi nw Campbell, elev 625 ft, Woodbine 3564 ft, Georgetown 3966 ft, cut fault in Georgetown, Goodland 4314 ft, Paluxy series

4358 ft, oil sand 4358-66 ft, pump 177 bbls 30-gr oil, 142 salt water, perf 4358-66 ft, td 4451 ft.

Hunt County—Junked: Ohio's Langford 1, 2467 ft snl and 1954 ft wel 377.56-ac tr and Jas. Hamilton sur, elev 484 ft, Gober chalk 1495 ft, jkd and abnd 2288 ft.

Panola County—Failure: Continental's Werner 1, Palmer sur, abnd 6431 ft.

TEXAS GULF COAST

Chambers County—Fig Ridge: Cox & Hamon's Tyrrell 1, 467 ft fr s&el w½ sec 72, F. P. Sterling sur, A-478, abnd 8705 ft.

Fort Bend County—Clodine: Wynn Crosby Drilling Co.'s Terry-Jones 1, 50-ac unit, Prairie View Farms suvdvn, John Brock sur, 5½-in 7553 ft, perf 7502-05 ft, flow 105 bbls, ⅛-in, td 7553 ft.

Harris County — Dyersdale: Tide Water's Roemer & Modglin 2, 58-ac tr, Houston Heights subdvn, Whitney Britton sur, 5½-in 4083 ft, perf 4068-77 ft, pump 72 bbls, td 4083 ft.

Jefferson County—Lovell Lake: Humble's Broussard Trust 44, s 9191 ft alg el fr ne cor 1653-ac lse, C. Hillebrandt sur, 5½-in 7779 ft, perf 7722-24 ft, flow 129 bbls, ⅛-in, td 7789 ft.

Jefferson County — Stowell: Texas Co.'s Steele-Schumacher Unit 1, 330 ft fr s&wl 40-ac unit, nw blk 16, Lutero Lopez sur, 5½-in 7843 ft, perf 7833-43 ft, flow 442 bbls, 12/64-in, td 7843 ft.

Matagorda County—North Markham: Sun's Braman 4, start at w cor 2903-ac tr, go se alg swl 3300 ft, th ne'ly at ra 510 ft, 40-ac tr, H. League sur, 5½-in 8109 ft, perf 7710-22 ft, flow 150 bbls ⅛-in, td 8109 ft.

San Jacinto County—Mercy: P. G. Lake's Allison 1, 50-ac tr, William Doble sur, A 93, n of prodn, 5½-in 8287 ft, open hole 8287-93 ft, flow 204 bbls, 3/16-in, td 8293 ft.

TEXAS GULF COAST EXTENSION

Chambers County—East Turtle Bay: R. J. Ursilla's Lotz B-1, 55-ac tr in G. B. Jamerson sur, 5½-in 6580 ft, perf 6565-72 ft, flow 99 bbls 10/64-in, td 6648 ft. Extends east.

TEXAS GULF COAST WILDCATS

Liberty County—Failure: Ohio Oil Co.'s Quinn 1, 660 ft out of most n'ly sw cor Daniel Donahoe, 4 mi e Cleveland, abnd 10,310 ft.

Matagorda County—Failure: Brewster-Bartle Drilling Co.'s Fuller-Nelson 1, 200-ac tr, I&GN sur, 5 mi ne Bay City, abnd 9010 ft.

LOWER TEXAS COAST

Jackson County—Collier: Texas Co.'s Collier 6, 330 ft fr nwl, 3630 ft fr nel of se 274-ac tr, James Kerr sur, A 39, abnd 2620 ft.

Jim Wells County — Seeligson: Magnolia's Seeligson 44, 391 ft fr wl, 660 ft fr sl 20,887-ac lse, Los Jaboncillos Gr, w flank, 7-in 6720 ft, sand 5205 ft, perf 5215-18 ft, flow 108 bbls, 7/64-in, td 6850 ft.

Karnes County—Hobson: Seaboard's Koency 1, 550 ft fr n&el 202-ac tr, Don Erasmo Seguin Gr, abnd 4315 ft.

Nueces County—Baldwin: Magnolia's Baldwin 6, 1971 ft fr wl, 1573 ft fr s'ly sl BS&F 165, 7-in 3260 ft, perf 3216-18 ft, flow 91 bbls, 9/64-in, td 6706 ft.

LOWER TEXAS COAST WILDCATS

Jackson County—Failure: Stanolind's Four-Way Ranch 1, 1980 ft fr nl, 1980 ft fr e'ly wl of 1000-ac lse, J. K. Looney sur, A 41, abnd 8664 ft.

Jim Wells County—Failure: Kilgore Developers and Butcher-Arthur Co.'s West 1, 2310 ft fr se&swl's 999-ac tr, Dibbrell subdvn, Casa Blanca Gr, abnd 5805 ft.

Jim Wells County—Failure: O. W. Killam's Starke 1, 467 ft fr n&wl's S. F. Stephenson sur 9, A 441, abnd 5015 ft.

Live Oak County—Failure: R. P. Holland's Tullis 1, 330 ft fr n&el's 20-ac tr, blk 75, Dr. Charles Simmons subdvn, S. B. Turner sur 19, abnd 2489 ft.

Live Oak County—Failure: Simmons Oil Co.'s Briam 1, 467 ft fr nw, 5742 ft fr nel Dennis McGowan sur, A 29, 1852-ac tr, abnd 8013 ft.

Victoria County—Failure: Arkansas Fuel's Terrell 1, 3341 ft fr n'ly nl, 1975 ft fr e'ly el 1900-ac lse, Colton & Colton subdvn, Antonio Siedeck sur, abnd 5411 ft.

Bee County—Failure: Hewit & Dougherty's Cantu 1, 660 ft fr n&wl's nw nw sec 81, J. J. Welder Rch, Benjamin Dale sur, abnd 6261 ft.

Goliad County — Discovery (Slick - Wilcox Field): Continental's Wood 1, 467 ft fr se & nel's 148-ac tr, CEPI&M sur, sw old shallow Slick field, 7-in 7692 ft, perf 7200-20 ft, flow 232 bbls, 5/32-in, td 8003 ft, opens Carrizo-Wilcox field.

Victoria County — Failure: Continental's Crain 1, 1650 ft fr n&el's 2080-ac lse, J. Vairin sur, A 123, w mi s North McFaddin, abnd 6400 ft.

SOUTHWEST TEXAS

La Salle County—New Mexico: Quintana's South Texas Syndicate 2-D, 5557 ft fr sl, 1077 ft fr wl 7488-ac tr, H&GN 7, abnd 6248 ft.

Starr County—North Sun: Sun's Laurel 4, 407 ft w of e'ly wl, 467 ft s of w'ly wl Hilaria de la Garza 70-ac lse, La Sal Colorado Gr, 5½-in 4556 ft, perf 4549-53 ft, flow 159 bbls, ¼-in, td 4556 ft.

Duval County — Loma Novia: Rodney DeLange's 4, 330 ft fr s&wl's se ne sur 76, abnd 2832 ft.

SOUTHWEST TEXAS WILDCATS

Duval County — Failure: Transwestern Oil Co.'s Duval County Ranch 32, 660 ft fr s&el's P. G. Salinas sur 302, abnd 2629 ft.

LaSalle County—Failure: Quintana's Gausemeier 1, 660 ft fr n&el's ne¼ H&GN sur 163, A 279, 9 mi s Los Angeles, abnd 5760 ft.

SOUTH CENTRAL TEXAS WILDCAT

Travis County—Failure: Robert E. Fallin's Wolters 1, 1524 ft fr nl, 1773 ft fr w'ly wl 295-ac tr, Michael Green sur, 15 mi se Austin, abnd 315 ft.

NORTH TEXAS

Archer County—Scotland: Shell's Coleman 1-E, 990 ft out nec lot 4, ATNCL 74, Bend 5163 ft, abnd 5276 ft.

Clay County — Joy: Consolidated Oil Co.'s Myers 1, 330 ft nsl and 3555 ft ewl C. Thompson sur, Bend 5487 ft, Mississippi 5985 ft, flow 12,096 bbls, 2-in lines, acid 3000 gals 5985-6062 ft.

Montague County—Davenport: Phil Lesh and McCall's Hensley 2, 1379 ft nsl and 330 ft wel of G. W. Tilley sur, granite 3013 ft, pump 15 bbls, perf 2432-48 ft, td 3020 ft, pb to 2448 ft.

Wichita County—KMA-Ellenburger: Staley Oil Co.'s Ferguson 6-E, 340 ft snl and 523 ft ewl blk 2, KWVFL, top KMA lime 3692 ft, Ellenburger 4295 ft, abnd 4350 ft.

Wichita County—K-M-A: Grace & Grace's Dorris 4, 6600 ft snl and 800 ft ewl J. R. Burris sur, pump 94 bbls, shot 200 qts 4047-98 ft.

Wichita County: Akin & Dimock's Weibener 1, 270 ft nsl and 2000 ft wel BBB&C sur A28, abnd 1860 ft.

Cochran & Cain's Waggoner Est. 2-A,

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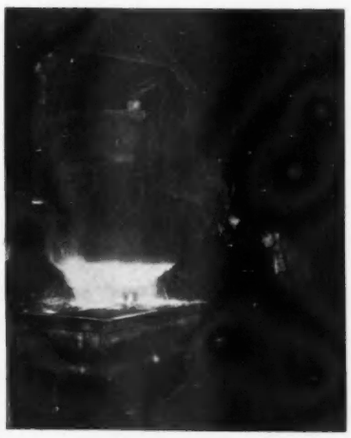

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HT&B sur A505, pump 45 bbls, sand 1860-92 ft.

Wilbarger County — Consolidated: Consolidated Oil Co.'s Ancell 1-D, ne sw ne H&TC 2, blk 7, Bend 3956 ft, Ellen. 4266 ft, flow 696 bbls ¾-in, acid 3000 gals 4266-90 ft.

Wilbarger County — Fargo: Humble's McCaleb 4, 440 ft snl and 1760 ft wel H&TC 34, blk 15, Strawn 4463 ft, pump 164 bbls, acid 5000 gals 4523-53 ft.

Young County—Allar: Panhandle Ref. Co.-S. H. Fagadau's Allar 9, 4779 ft snl and 1815 ft wel of s-1185 ac tr, TE&L 3409, pump 18 bbls oil, 18 water, sand 2708-12 ft, td 2729 ft, pb to 2712 ft.

Young County: Ray Oil Co.-J. P. Nash's King-Wooten 5, 510 ft out sec TE&L 1976, Bend 3808 ft, Marble Falls 4264 ft, Miss. 4817 ft, flow 704 bbls, 17/64-in, perf 4158-73 ft, td 4841 ft.

Anzac Oil Corp.'s Martin 1-D, 660 ft nsl and 685 ft ewl of Geo. Cothran sur A-1401, Bend 3368 ft, abnd 3503 ft.

Young County—Daws: Standard of Texas-Hanlon & Buchanan's Daws 1, lse 5, 1400 ft nsl and 467 ft wel TE&L 1676 ft, Bend 3889 ft, abnd 3894 ft.

NORTH TEXAS WILDCATS

Archer County — Oil Discovery: Phillips' Wilson-Luke 1, nw nw ne ATNCL 117, elev 986 ft, Bend 4881 ft, Ellenburger 5573 ft, flow 376 bbls 42-gr, ⅝ to ½-in, perf 4881-90 ft, td 5623 ft.

Clay County — Oil Discovery: Continental-W. B. Omohundro's Stephens 1, 2043 ft snl and 1347 ft wel G. W. Stipps sur, A 249, Bend 5540-5608 ft, Mississippi 6010 ft, flow 390 bbls 48.6-gr, gas-oil ratio 514/1, 18/64-in, cp 1400-1225 lbs; tp 775-500 lbs, 6011-49 ft.

Clay County—Failure: F. H. Gohlke et al's Bilbrey 1-B, 660 ft from ne and 620 ft from nw lines blk 27, Pratts subdiv, abnd 1353 ft.

Jack County—Oil Discovery: Standard of Texas-Hanlon & Buchanan's Peek-Shell 1, 567 ft wel and 1206 ft nsl of n-135-ac of TE&L 3304, 3 mi se Ellis pool, elev 1066 ft, Merriman 1170 ft, Capps 2070 ft, Bend 4576 ft, flow 229 bbls 40.5-gr, 1915/1 gas, ¾-in, acid 1000 gals 4579-89 ft.

Young County — Oil Discovery: Anderson-Prichard Oil Corp.-Col-Tex Ref. Co.'s Latimer 1, 815 ft snl and 534 ft wel of s-136½-ac blk 17, Young CSL sur, 3½ mi se Murray pool, elev 1204 ft, Palo Pinto 1524 ft, Bend 3635 ft, flow 65 bbls 41-gr oil, 60 water, ½-in, acid 1000 gals 3635-45 ft, td 3654 ft.

WEST TEXAS

Andrews County—Embar-Permian: Phillips' University-Andrews 36, c nw sw sec 32, blk 10, flow 312 bbls, ¼-in, acid 3000 gals Clear Fork, td 6245 ft.

Andrews County—Fullerton: Fullerton Oil Co.'s Wilson 6-A, c nw nw PSL 16, blk A-32, 6,000,000 gas, Yates sand 3100-18 ft, td 3122 ft.

Cochran County — Slaughter: Devonian et al's Duggan 31-A, 560 ft snl and 510 ft ewl lab 3, leag 55, Oldham CSL, flow 640 bbls, 2½-in, acid 12,000 gals 4963-5009 ft.

Ector County—North Cowden: Stanolind's Midland Farms 6-D, 91 ft w and 1880 ft n of swc sec 44, blk 42, but in W. Callihan sur 100, flow 563 bbls 1-in, shot 580 qts 4605-4803 ft, td 4825 ft.

Hockley County—Slaughter: Jerry Hawkins et al's Mallet 51-A, 580 ft out swc lab 13, leag 47, Edwards CSL, flow 798 bbls cas, acid 11,500 gals 4890-4940 ft.

Texas Co.'s Slaughter 139, 551 ft snl, 660 ft ewl lab 60, leag 39, Maverick CSL, flow 1176 bbls, cas, acid 14,000 gals 4920-5005 ft.

Upton County—McCamey: Trebol Oil Co.'s Ricker-Humble 3-C, 2078 ft from ne and 1883 ft from nw lines sec 6, blk R, Grooms sur, pump 167 bbls oil, 9 water, acid 2000 gals 2510-58 ft, td 2565 ft, pb to 2558 ft.

Yoakum County—Wasson: DeKalb Agricultural Ass'n Armstrong-Humble 3, 2085 ft wel and 1875 ft snl sec 889, flow 596 bbls 1-in, acid 14,000 gals 4999-5097 ft.

WEST TEXAS WELL DEEPENED

Ward County—Estes: Gulf's Estes 1, 330 ft out e cor H&TC 38, blk 34, otd 2951 ft, flow 17 bbls, flow valves, 3030-85 ft.

WEST TEXAS WILDCATS

Fisher County—Failures: Humble's Willingham 1, c ne ne H&TC 43, blk 3, elev 2053 ft, San Angelo 1600 ft, Wolf Camp 3010 ft, Swastika 4420 ft, black shale 4480 ft, abnd 4420 ft.

Hunter & Hunter's Fillingim 1, c nw sw H&TC 112, blk 3, elev 2115 ft, Merkel lime 1275 ft, red zone 2060-2150 ft, lime 3480 ft, abnd 4506 ft.

Martin County—Failure: M. J. Delaney & Co.'s Scharbauer-Texaco 1, c se sw T&P 27, blk 39, T-1-N, elev 2878 ft, anhydrite 1905 ft, Yates sand 3005 ft, jkd and abnd 5201 ft.

Reagan County—Failure: Humble's Sawyer 1-B, 1320 ft snl and 1650 ft ewl T&P 13, blk 1, elev 2516 ft, Yates sand 1330 ft, solid lime 2340 ft, Strawn 9330 ft, Ellenburger 9960 ft, abnd 9995 ft.

WEST CENTRAL TEXAS

Coleman County—Rock Crusher: W. J. Murray et al's Wisener 1, 1750 ft wel and 2400 ft nsl Jas. P. McLean sur 687, flow 6 bbls, ¼-in, shot 40 qts 3140-49 ft, td 3160 ft, pb to 3149 ft.

Jones County — Strand: Ungren-Frazier et al's H. Strand 1, 510 ft snl and 810 ft wel s½ sw H&TC 5, blk 5, flow 257 bbls, ½-in, Palo Pinto lime 3456-62 ft.

Jones County — Wimberly: North American Oil Consolidated's Mashburn 3, 330 ft out nwc e½ s½ lot 86, DeWitt CSL, leag 126, flow 672 bbls, ¾-in, 2285-2314 ft.

Shackelford County: R. H. Roark et al's Nail 6, c nw ne ET 136, pump 45 bbls, sand 1505-12 ft, td 1515 ft.

WEST CENTRAL TEXAS WILDCATS

Coleman County — Oil Discovery: Jas. C. Ellis-F. J. Estes Est's Ray 1, 921 ft ewl and 403 ft nsl 168-ac tr, Jas. P. McLean sur, elev 1944 ft, Adams Branch 2205 ft, Gardner-Strawn 3128 ft, pump 18 bbls, shot 22 qts 3135-50 ft, broken pay 3129-50 ft, 3162 ft, pb to 3150 ft.

Taylor County—Failure: Drilling & Exploration Co.'s Gibson 1, 330 ft out sec n½ lot 8, leag 147, Grimes CSL, elev 1843 ft, otd 3100 ft, Bend 5128 ft, abnd in Ellenburger 5475 ft.

TEXAS PANHANDLE

Gray County: Phillips' Clay 2, c se nw H&GN 177, blk B-2, pump 93 bbls, granite-wash 3023-48 ft.

Stanolind's Bowers 3-A, 810 ft nsl and 510 ft ewl w½ sw H&GN 63, blk B-2, abnd 3172 ft.

Hutchinson County: Gulf and Panhandle Ref. Co.'s Dial 112, sec 90, blk Z, pump 54 bbls, shot 540 qts 2930-3090 ft, td 3094 ft.

J. M. Huber Corp.'s Weatherly 28-A, 765 ft out nwc A&M 25, blk Y, pump 52 bbls, granite-wash 3037-60 ft, td 3148 ft, pb to 3125 ft.

TEXAS PANHANDLE WELL DEEPENED

Gray County: Continental's Wright 1, sw sw nw I&GN 13, blk 3, otd 2844 ft, pump 135 bbls, td 2982 ft.

WYOMING

Converse County—Shawnee: Joe Kaufman et al's Govt. 1, sw sw nw 25-32n-69w, bailing 30 bbls, Basal White River, td 641 ft.

Fremont County—Pilot Butte: British-American's Tribal-D, cwl sw nw 15-3n-1w, swab 470 bbls, Tensleep 6204 ft, 7-in 6242 ft, td 6349 ft.

Natrona County—Cole Creek: General's 73-G-21 (Govt.), nw se ne 21-35n-77w, pump 80 bbls, Shannon 4525 ft, 5½-in 4515 ft, td 4562 ft.

Niobrara County—Lance Creek: Continental's Apex-1 8, nw nw ne 34-36n-65w, swab 156 bbls, 7-in csg top First Leo 5341 ft, td 5401 ft.

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■ Will trade Standard No. 2 Cable Tool Drill Rig, good condition, drill lines no good, for Sullivan or Failing Core Drill—or will sell my rig reasonable. Tedford Drilling Co., Inc., 700 Broadway Street, Little Rock, Arkansas.

WANTED TO BUY

■ WANTED: Low power binocular microscope, preferably Spencer make, suitable for examination of oil well cuttings. Give full details first letter including make, model, condition, range of power, and price. Cosden Petroleum Corporation, Att'n: Mr. C. F. Barnes, Geologist, P.O. Box 1311, Big Spring, Texas.

LEASES AND DRILLING ACREAGE

■ LARGE STRUCTURE fully geologized, cored to gas. Have drilling equipment available. Contractor was drafted. Will deal for completion. S. W. Pressey, Pueblo, Colo.

■ East Texas — Investigate. Buyers making quick profits on leases ahead of drill. $2 acre up. References Satisfied Investors. E. M. ADAMS, Marshall, Texas.

OIL INDUSTRY PRINTED FORMS

■ **Immediately available all types of printed forms generally used by oil companies. Lease forms, daily production and gauge reports, priority, purchase and emergency order forms, labor time sheets, daily truck drivers reports, material and pipe tally forms, etc. Complete catalog on request. Address Oil Form Dept., Gulf Publishing Company, Houston, Texas.**

HELP WANTED

■ Wanted: Land and title man, by major oil company in New Orleans. Legal training preferred. Deferred draft status essential. Write to Box 46, care Oil Weekly, Houston, Texas.

WANTED MECHANICAL ENGINEER

■ With experience in design of oil well drilling and servicing equipment. Excellent opportunity for a man with creative ideas, ability and good personality. The person employed to fill this position will work under the Chief Engineer and will be responsible for all work in this field. Permanent position with major company located in the Southwest. State education, experience, age, draft status and other particulars, including recent photograph in first letter. Essential worker applicant must have war manpower commission certificate of availability. Reply Box 50, c/o Oil Weekly, Houston, Texas.

MANUFACTURERS' REPRESENTATIVE

■ Want to handle on Distributor basis recognized oil field item for Mid-Continent. Would consider outright purchase of line and plant. No brokers. Replies confidential. LaMont—phone Capitol 0256, Houston, Texas.

ADVERTISING RATES

TRADING POST SECTION

Regular classified advertisements for this special section, set in type this size without border, take flat rate of 7 cents per word for the first insertion and 5 cents per word for each subsequent insertion of same copy. Display advertisements for this section, set in suitably larger type with ruled border, are $5.00 per inch for first insertion and $4.00 per inch for subsequent insertions. Remittance must accompany copy which should be sent to:

Trading Post Section, THE OIL WEEKLY
P. O. Box 2608 Houston, Texas

Oil Is Ammunition

Every torpedo, whether launched by submarine, plane or warship, needs a staunch lubricant on its spinning propeller shaft, else it might fail in its deadly mission. The grease must stick tight and not wash off in salt water. Also, it must not deteriorate during the long period the torpedo may lie idle before launching.

United States Wildcat Starts

ARKANSAS

Calhoun County: Placid Oil Co.'s Southern Lbr. Co. 1, se sw 22-16s-13w, rig.
Columbia County: Northern Ordnance's Waggoner 1, nw ne 10-19s-23w, lcn.
Hempstead County: Barnsdall's Schultz 1, approx e½ ne ne 34-13s-26w, mir.
Logan County: Star Mfg. Co.'s Foster 1, sw ne 26-5n-28w, dr.
Miller County: N. Hobson Wheless' Wisinger 1, nw se 9-20s-27w, lcn.
Nevada County: Plymouth Oil Co.'s Grove 1, se ne 21-14s-20w, lcn.
Ouachita County: DeKalb Agricultural Assn.'s McGaughy 1, nw sw 31-14s-18w, mim.

CALIFORNIA

Kern County: Texas Co.'s Bowerbank Unit 3-8C, se nw sw 8-29-24, Bowerbank area, lcn.
Continental's KCL G-1, nw nw ne 4-30-26, McClung area, lcn.
Los Angeles County: Seaboard Oil Co.'s 1, se sw ne 21-1-13, Chavez Ravine district in Los Angeles City area, lcn.
Charles E. McCartney's Hurley 1, sw se sw 4-2-10, Puente Hills area, lcn.
Monterey County: Royalty Service Corp.'s Federal 1, se se ne 21-24-10, Bradley area, lcn.

ILLINOIS

Edwards County: Olson Oil Co.'s Felix 1, nw nw sw 31-1s-10e, drlg.
Gallatin County: N. Davies et al's Tate 1, e½ se ne 30-8s-10e, lcn.
St. Clair County: H. Goss' Englerth 1, c sw sw ne 31-1s-8w, lcn.
Washington County: Texas Co.'s Kokesh 1, sw sw se 32-2s-4w, lcn.
Wayne County: Buren & McGregor's Fee 1, nw se 32-1s-7e, drlg.
White County: Whisenant & Trenchard's Owen 1, sw nw nw 18-4s-14w, lcn.

KANSAS

Cowley County: B. B. Blair's Jarvis 1, c n½ ne sw 31-32s-3e, lcn.
Creekmore & Rooney's Synder 1, swc ne 7-33s-4e, mirt.
Jefferson County: Sagamore's Snyder 1, c sw nw 31-9s-19w, lcn.
Graham County: Helmerich & Payne's Casey 1, nec nw 7-7s-22w, c&p.
Greenwood County: Simpson Oil's Dixon A-1, sw ne se 19-28s-9e, lcn.
Leavenworth County: McLaughlin's Dietrich 1, c ne nw 34-8s-20e, mch.
Russell County: Nadel & Gussman's Weber 1, c ne se 35-15s-12w, cellar.
Saline County: Auto Ordnance's Blomberg 1, sw se se 12-16s-4w, lcn.
Phil-Han's Currie 1, nwc sw 10-15s-1w, dr.
Shawnee County: C. W. Murchison's Federal Land Bank 1, sec 28-10s-15w, br.

MICHIGAN

Allegan County: C. W. Cook's Kalmink 1, sw sw se 3-3n-15w, rig.
Mason County: C. M. Russell, Tr.'s Anderson 1, n½ ne nw 16-19n-17w, lcn.

NORTH LOUISIANA

Bienville Parish: Placid Oil Co.'s Nebo B-1, sw ne 13-15n-7w, dr.
Caddo Parish: F. J. Hall's K. Beard 1, se 9-18n-16w, dr.
H. C. Owens et al's Caddo Levee Board 1, se se 12-22n-16w, lcn.
Catahoula Parish: California Co.'s Tckhardt 1, ne ne 12-9n-7e, dr.
Sinclair Prairie's State 1, nw se 30-9n-7e, dr.
Claiborne Parish: Benedum - Trees Co.'s Vaughn 1, ne nw 23-23n-5w, dr.
Frank & George Frankel's Muslow 1, c w½ ne nw 30-21n-7w, dr.
Concordia Parish: Gulf's Nelms 1, sw ne 10-1n-8e, mim.
DeSoto Parish: A. W. Phillips et al's Pollock 1, se ne 8-13n-12w, spud.
Jackson Parish: Mid-Continent's Tremont 1, se ne 31-15n-3e, lcn.
Morehouse Parish: McElreath-Suggett et al's Bonita 1, nw nw 11-22n-9e, lcn.
Sabine Parish: H. D. MacDonald's Long Bell 1, se sw 34-9n-13w, lcn.
Seaport Oil Corp.'s Phares 2, ne nw sw 4-5n-12w, dr.
Tensas Parish: Carter's Shelley 1, sw ne 19-11n-10e, rig.
Webster Parish: J. I. Roberts et al's Garland 1, ne se 24-22n-9w, rig.
East Carroll Parish: Hunt Oil Co.'s Continental 1, nw sw sw 77-22n-13e, dr.
West Carroll Parish: R. W. Williams' Marston 1, ne sw ne 14-19n-10e, dr.

OKLAHOMA

Grant County: Broderick & Gordon's Horton 1, c ne se 34-25n-4w, lcn.
Okfuskee County: McIntyre's Martin 1, c nw se 12-12n-8e, dr.
Osage County: Keener O&G Co.'s Ross 1, se se nw 29-22n-7e, rur.
Seminole County: Senora O&G Co.'s Griffin 1, se se 29-5n-6e, rur.

EAST TEXAS

Cass County: Sohio Oil Co.'s Taylor 1, H. Reams sur, mim.
Marion County: J. M. Horne et al's Torrans 1, T. J. White sur, lcn.

NORTH TEXAS

Archer County: J. L. McMahon et al's De-Moss 1, 330 ft nsl and 600 ft wel sec 17, blk 5, Clark-Plumb sur, lcn 1150-ft test.
Jack County: Standard of Texas-Hanlon & Buchanan's Smith 1, 660 ft out sec 188-ac lse, O.H.P. Davis sur A 186, lcn Ellenburger test.
Throckmorton County: White-Duncan et al's Fee 2, 990 ft out sec blk 50, Comanche Indian Reserve, lcn 900-ft test.
Young County: Sinclair Prairie's Ernest 1, 660 ft w and 2919 ft n of swc Wm. Tryndale sur, but in F. Peterswick sur, A 218, lcn Ellenburger test.

WEST TEXAS

Dawson County: Gulf's Dean 1, c ne nw J. Poitevent sec 30, blk 1, T-6-N, lcn 9500-ft Ellenburger test.
Pecos County: E. R. Lloyd et al's Powell 1, 660 ft from sw and 1980 ft from se lines H&GN 76, blk 10, lcn 1800-ft test.
Reeves County: Standard of Texas' Keasler 1, c sw nw PSL 10, blk 72, lcn 7200-ft Delaware test.

TEXAS GULF COAST

Austin County: Pan American's Austin College 1, 160-ac tr, William C. Harvey sur, 6500 ft sw nearest wells at Raccoon Bend, lcn Wilcox test.

LOWER TEXAS COAST

Jackson County: Sun's Classen 1, Collier area, 5800 ft fr ne and 467 ft fr sel 2464-ac tr, James Kerr sur, lcn.
Karnes County: Union Producing Co.'s Porter 1-W, North Pettus area, 1320 ft fr sw, 2250 ft fr sel Brooks & Burleson sur 23, A413, lcn Wilcox test.
Lavaca County: Merlyn Christie and O. C. Garvey's Fell & Fell 1, ctr n 40-ac of 75-ac James Kerr sur, 4 mi sw Hallettsville, lcn 7500-ft Wilcox test.
Willacy County: Baldridge & King's Cavazos 1, 467 ft fr n&wl lot 3, blk D, share 12, San Juan de Carricitos Gr, 15 mi se Raymondville, lcn 8500-ft test.

SOUTHWEST TEXAS

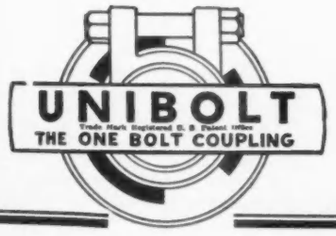
Jim Hogg County: Sun's East 1, 3 mi sw Gutirrez area, 1980 ft fr s&wl G. N. Scoggin sur 44, lcn.
Starr County: Hagan & Stewart's Ramos 1, 2607 ft fr swl, 2303 ft fr sel of AB&M 150, lcn 1350-ft test.
Starr County: Judge Bros.' Salinas 1, Sacatosa area, 660 ft fr se, 3250 ft fr swl 1220-ac tr, Antonio Canales Salinas gr, lcn 1700-ft test.

Unibolt

"FLEXI-BALL JOINT"

Clearing house for contraction and expansion in steam lines.

THORNHILL-CRAVER COMPANY
HOUSTON



"Every dime and dollar not vitally needed for absolute necessities should go into WAR BONDS and STAMPS to add to the striking power of our armed forces."
—*President Roosevelt*

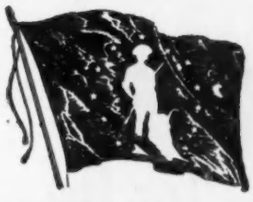
IN WAR BONDS

★ ★ ★ ★ ★ ★ ★ ★

New Goal for Payroll Savings Plan!

Along with increased war production goals go increased costs . . . extra billions which must be raised, and raised fast, to win this war. That means we must raise our sights all along the line, with every firm offering every American with a regular income the chance to buy more *War Bonds*. YOUR help is asked in encouraging employees to put at least 10 percent of their pay into War Bonds every payday, through the Payroll Savings Plan.

For details of the Plan, approved by organized labor, write, wire, or phone Treasury Department, Section T, 709 12th St. N. W., Washington, D. C.



U.S. WAR SAVINGS BONDS

This space contributed to America's All-Out War Program by

THE OIL WEEKLY

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SIMPLE • STURDY

EFFICIENT • COMPACT

VERSATILE

This indispensable tool has established an enviable world wide reputation by satisfactory performance.

Illustrated model catches and packs off pipe and tool joints and mills over pipe. Single bowl models and other multiple bowl models available.

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Full details upon request

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OIL WELL CLEANOUT TOOLS

Forging Ahead

For the American Victory

OIL CITY BRASS WORKS
FOUNDERS MANUFACTURERS MACHINISTS
Beaumont, Texas, U.S.A.

Squeaks from the Bull Wheel

Deduction

"Is this a picture of your fiancee?"
"Yes."
"She must be very wealthy."

Ingenious

"What in the world do you want to buy a crib with such high sides for?"
"Well, then it'll be easier to hear him when he falls out."

Quick Change

"A soupbone, please," said the lady customer.
"For your family, or for the dog?" asked the butcher.
"For the family," said the customer.
"Too bad," the butcher mused. "If it was for the dog, I could give it to you without ration points."
"Oh, well," said the quick-thinking lady, "never mind the bone for the family; just give me one for the dog."

Signs

"What makes you think your young man has matrimonial intentions?"
"Well, when we were looking at hats he tried to convince me I look better in a $2.98 model rather than one that cost $15."

Not So Hard

Every man present had suffered some unpleasant experience at the hands of this banker, and all save one offered testimony concerning his hard-heartedness.
"Haven't you something to say against that scamp?"
"No. I don't think he's so tough."
"He turned you down on a loan, didn't he?"
"Yes, but he hesitated before he refused."

One in Every Port

Saleslady (at greeting card counter): "Here's one with a lovely bit of sentiment—'To the One and Only Girl I Ever Loved.'"
Sailor: "Fine. I'll take a dozen of 'em."

Saturday Night

An employer was trying to find out from one of his negro workers why he objected so strenuously to working on Saturday night:
"George, you are willing to work on Saturday afternoons, Sunday afternoons and Sunday night, when necessary. Now why don't you want to work on Saturday nights?"
"Well, Boss, if you had ever been a colored man on Saturday night you wouldn't ever want to be a white man again as long as you live."

Help!

A preacher dialed long distance in order to call a clergyman friend of his in a distant town.
"Do you wish to place a station to station call?" asked the operator.
"No," came the answer, "parson to parson, please."

Forgotten Phrases

"Fill her up, sir?"
"Another cup of coffee?"
"Need any blades?"
"The customer is always right."

We buy refinery and oil field equipment, oil leases, pipe and valves.

SOONER PIPE & IRON COMPANY
15 East Cameron
Tulsa, Okla.

HOUSTON LABORATORIES
Analytical and Consulting Chemist
Podbielniak Gas Analysis
Oil Field Brines, Waters and Cores
Complete Evaluation of Crude Oils
Long Distance 267, Box 132, Houston, Tex.

THE FORT WORTH LABORATORIES
Analysis of oil field brines, cores, gas, oil and minerals. Field gas testing. R. H. Faah, Vice President; Long Distance 138. 823½ Monroe Street, Fort Worth, Texas.

William M. Barret, Inc.
Consulting Geophysicists
Specializing in Magnetic Surveys
Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative technique.
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SHREVEPORT, LOUISIANA

Safe... and Sure
JUSTRITE
Twin-Bulb
ELECTRIC LANTERNS

634 Candle Power Beam

Safe — because they're approved by U.S. Bureau of Mines; also by Underwriters' Laboratories, Inc., for use in hazardous Class 1, Group D locations.

Sure — because they feature instant-acting twin-bulb design; sturdy, easily-replaceable case construction.

You need Justrite on your job—ask at your supply store.

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Safety Products
SAFETY CANS · FILLING CANS · OILY WASTE CANS
APPROVED SAFETY ELECTRIC LANTERNS

Easy-to-read, *raised* black graduations on crack-proof white surface... resist abrasion from oil, sand, scraping on the pipe pile, etc. In all sizes and types—in cases or reels. Ask your dealer—or write for catalog.

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SOUTHERN PUMPING UNITS

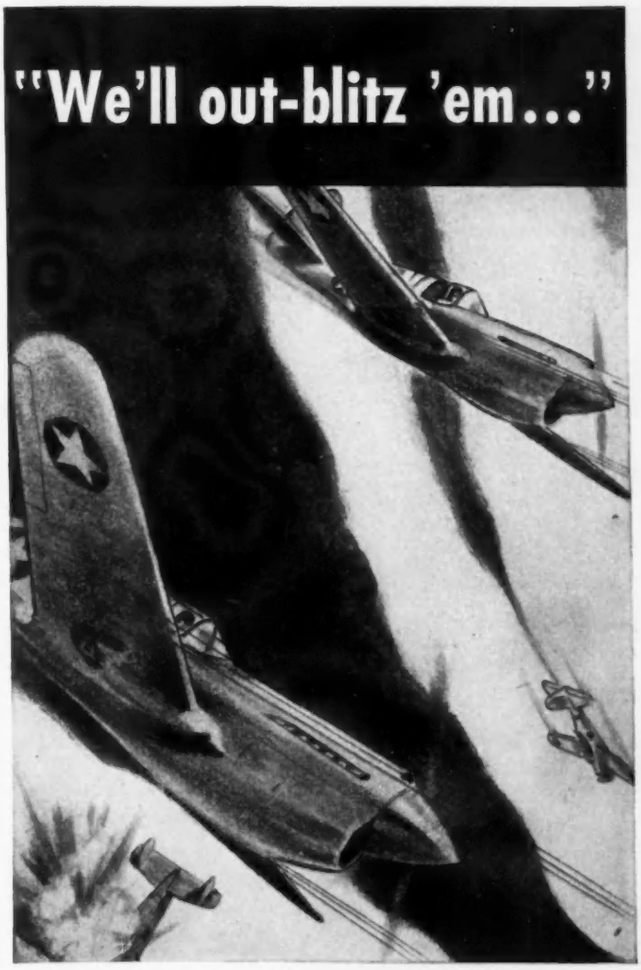
Unit No. V-140

Le Roi Power Unit — Viking Pump. Capacity 140 barrels per hour.

Complete units and replacements in Houston and Kilgore stocks.

SOUTHERN

Southern Engine & Pump Company
HOUSTON DALLAS KILGORE



"if you out-build 'em!"

Rat-tat-tat . . . and down goes another enemy plane! Our pilots and bombardiers have what it takes to out-blitz them.

It's our job back home to *out-build* the enemy. We're now doing it. Keep it up, America—work hard, avoid waste, buy more War Bonds!

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK
Manufacturers of GARLOCK Packings, Gaskets and KLOZURE Oil Seals

Tulsa, Okla. Houston, Texas Los Angeles, Calif.

GARLOCK

Notes for the Equipment Buyer and User

Enclosed Motors

GENERAL ELECTRIC COMPANY

General Electric Company, Schenectady, New York, announces a new line of totally enclosed motors. Available in both the polyphase, 60-cycle, induction type and the single-phase, 60-cycle, capacitor type, the new motors are especially designed for use under conditions where abrasives, chemicals, rain, snow, and excessive dirt are encountered.

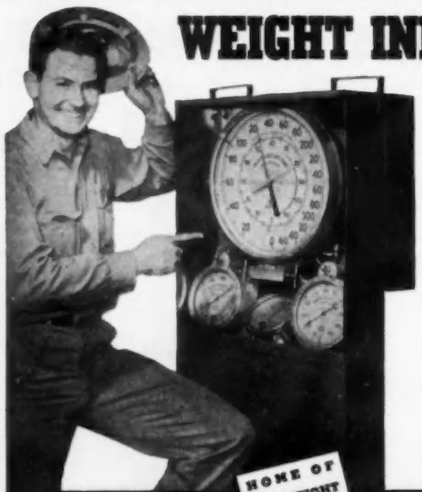
The polyphase motors are furnished in frame sizes 203 to 225. They include ½, ¾, and 1 horsepower at 900 rpm; ¾, 1, and 1½ horsepower at 1200 rpm; 1, 1½, and 2 horsepower at 1800 rpm; and 1½ and 2 horsepower at 3600 rpm. The single-phase motors are furnished in frame sizes 203 and 204, and include ¾ horsepower at 1200 rpm; 1 and 1½ horsepower at 1800 rpm; and 1½ and 2 horsepower at 3600 rpm. The mounting dimensions of these motors are interchangeable with Tri-Clad open motors of the same rating.

G-E Enclosed Motor

These new motors have all the important basic features of the Tri-Clad group. This includes triple protection—protection against physical damage, electrical breakdown, and against normal operating wear and tear.

In addition, all parts of the motor enclosures—frame, end shields, and conduit boxes—are cast iron, thus offering high resistance to rust, corrosion, accidental blows, and rough use. Also, the leads are permanently encased in compound in a cast-in pocket in the stator frame, thus preventing liquids from seeping into the motor. Still further protection is provided in the form of a rotating labyrinth seal, which prevents dirt, oil, or water from entering the bearing housing. The motors are wound with Formex wire.

The National Supply Company received a fourth war-production award on May 19, with presentation of the Army-Navy E at the Torrance, California plant. A. E. Walker, president of the company, received the award which was presented by Lieutenant Colonel Lawrence C. Ames, A.A.F. Rear Admiral Joseph R. Defrees, retired, Inspector of Naval material, Los Angeles District, gave the principal address and paid tribute to the workers and management for their achievements.



WEIGHT INDICATOR POINTS

IN FIGHTING BATTLES and drilling wells, ACCURACY IS OF THE GREATEST CONSEQUENCE. With today's scarcity of steel and labor, straight holes are more important than ever before. You can't afford to take a chance on too much or too little—weight—speed—pressure—torque, when it comes to drilling hole. The best equipment available is the cheapest. The "Sealtite" Drilling Control provides the ultimate in accuracy and sensitivity even on the toughest jobs. And because it's leak-proof, the "Sealtite" provides trouble-free operation and years of uninterrupted service. It's the master control instrument for any drilling job, in any field.

HOME OF THE WEIGHT INDICATOR

MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

SAN JOAQUIN VALLEY: A. F. McQUISTON, BAKERSFIELD, CALIFORNIA
MID-CONTINENT DISTRIBUTOR: REED ROLLER BIT COMPANY, HOUSTON, TEXAS

Bethlehem Supply Company Opens New Store in Kansas

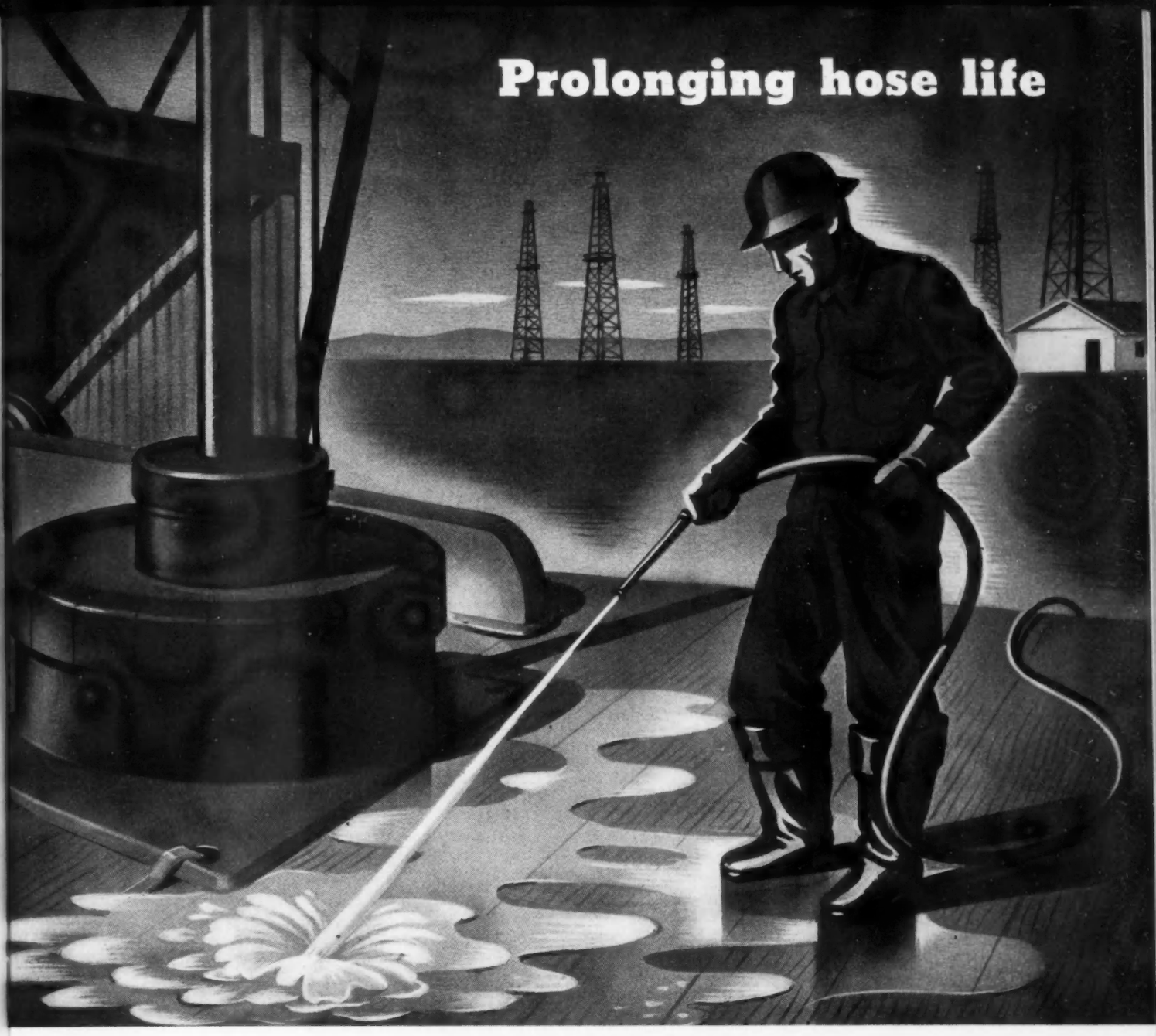
Bethlehem Supply Company announces the opening of a new store at 414 South Main Street, Pratt, Kansas, to serve the southeastern Kansas district. The store will be open for business by June 15.

Driving Manual

Ethyl Corporation, Chrysler Building, New York City, has published a comprehensive manual called "Professional Driving," in the interest of national safety and conservation.

The publication contains driving helps compiled from personal interviews with more than 100 of the world's finest drivers, with twenty-three personal interviews from drivers who have won citations for their driving ability.

Designed for experienced drivers who would like to improve their driving, the booklet is a reference book on driving problems and practices.



Information supplied by "The Oil Weekly"

For a long time rubber hose was considered more or less expendable. It was easy to get, and not especially expensive. Today, for obvious reasons, every effort must be made to prolong hose life. Hence, the following suggestions are offered:

1. Unpack carefully, and let coil untwist naturally to avoid kinking.
2. Do not stretch hose "to make it reach." Leave one end free if possible, or leave slack between couplings to compensate for shortening when filled.
3. Do not load over manufacturer's ratings.
4. Support loaded hose for its entire length.
5. Avoid sharp bends and kinks; especially do not kink hose to cut off flow.
6. Locate shut-off valve ahead of hose, so hose will be relieved of pressure when not in use.
7. Check service carefully. Do not subject suction hose to high pressures, or use outside reinforced hose on suction lines.
8. Keep hose free from oil, grease, acids, or alkalis. Clean surface carefully at frequent intervals.
9. Do not hang hose over nails, pipes, rafters, or other supports that will kink or crease it.
10. Store in a cool, dry, dark place that is as free from dust as possible.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E ★ NAVY

MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Mo-lyb-den-um Company
500 Fifth Avenue • New York City

MOLY

OIL WELL IMPROVEMENTS CO.

Pioneer creator and manufacturer of drilling and producing equipment has been in the

FIRST LINE

of the Oil Industry's

Production Front

Now . . .

OWI products are serving in the

FIRST LINE

of the Navy's

Destruction Front

Orbit Geared Master Valve

And while most of our production facilities are devoted to vital production for our fighting Navy, we will continue to furnish Orbit Valves to the Oil Industry to the limit of our ability.

If you have any questions regarding the care and maintenance of your Orbit Valves, write us.

OIL WELL IMPROVEMENTS CO.

TULSA, OKLAHOMA

Men in the Industry's News

E. O. BENNETT has resigned as chief petroleum engineer for Continental Oil Company, Ponca City, Oklahoma, effective June 15, and will immediately establish an office as a petroleum consultant at 342 Mellie Esperson Building, Houston. He has been with Continental Oil Company since 1926, having served as chief engineer, assistant manager of production and chief petroleum engineer, and has devoted much of his time to field operations along the Gulf Coast. He is recognized as an authority on oil production methods, particularly in pressure-maintenance operations in high-pressure fields, and has been granted a number of patents for pipe-line, drilling and production equipment. Active in the industry's association activities, he has contributed extensively to the literature. For his contributions to the natural-gasoline industry he was given the Hanlon Award in 1942 for distinguished service to that branch of the industry, and more recently was awarded the degree of doctor of engineering by Texas A. & M. College, "in recognition of his outstanding contribution to engineering science."

WARNER CLARK, general manager of conservation in Standard Oil Company of California's producing department, has been elected chairman of the Conservation Committee of California Oil Producers. The committee, which is composed of representatives of California oil operators, acts as an advisory group to the operators on conservation matters.

C. A. McCOLLUM, district manager at Houston for the National Supply Company, has gone to Washington to serve in the materials section of PAW.

CHASE E. SUTTON of The Pure Oil Company showed moving pictures taken on a recent trip through South America, and discussed the Venezuelan petroleum law at the regular monthly meeting of the Houston Chapter of Nomads June 7. After completing his talk, he answered questions pertaining to different points of the new law.

DR. HUGH M. HUFFMAN, formerly of the California Institute of Technology, has been appointed director of a new laboratory at the Bureau of Mines experiment station at Bartlesville, Oklahoma, it was announced by the Interior Department June 9. The new laboratory will devote itself to studies of processes for producing synthetic rubber. The initial project will be an investigation of the possibilities of direct conversion of butane to butadiene, requested by PAW. The laboratory also will undertake studies to develop thermodynamic data for processes used in the manufacture of aviation gasoline and toluene, lacking which refiners have been compelled to develop processes by empirical methods.

HAROLD S. THOMAS, former Oklahoma City geologist who has been a consultant in Lincoln, Nebraska, several years, has joined the PAW staff as a petroleum analyst.

M. W. DAVID, Phillips Petroleum Company geologist, has been transferred from Midland, Texas, to Evansville, Indiana.

H. C. ANDERSON of Texarkla Oil Corporation was elected chairman of the Ark-La-Tex chapter of the American Petroleum Institute at a recent meeting in Shreveport. He succeeds T. W. Johnson, Union Producing Company. D. W. Atkins, Jr., Ohio Oil Company and Oscar Beasley, Oil Well Supply Company were elected to serve as vice chairmen. William L. Stanton, Arkansas Fuel Oil Company was appointed secretary-treasurer. Elected to serve for two years as members of an advisory committee included F. E. Steel, Lion Oil & Refining Company, El Dorado, Arkansas, J. Fromer, Ohio Oil Company, Shreveport, R. L. Long, Hughes Tool Company, Shreveport, and T. W. Johnson, Union Producing Company, Shreveport. Charles Mangold is program chairman for the year.

HARRY L. EDWARDS, 54, president of Harry L. Edwards Drilling Company, Houston, died June 10. Edwards had been identified with the oil industry for more than 25 years. After rising to prominence with a large oil company, he organized his own drilling concern.

Advertisers' Index

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